PEST CONTROL

OCTOBER 1956

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Dr. Mark D. Hollis, chief sanitary engineering officer for the U. S. Public Health Service, and an Assistant Surgeon General of the United States, is one of the featured speakers at the 23rd annual NPCA convention now underway in Detroit. Dr. Hollis, along with other speakers, will take part in a program designed to interpret the PCO's role in public health. Full details on talks and events scheduled for 1956 meeting begin page 36.

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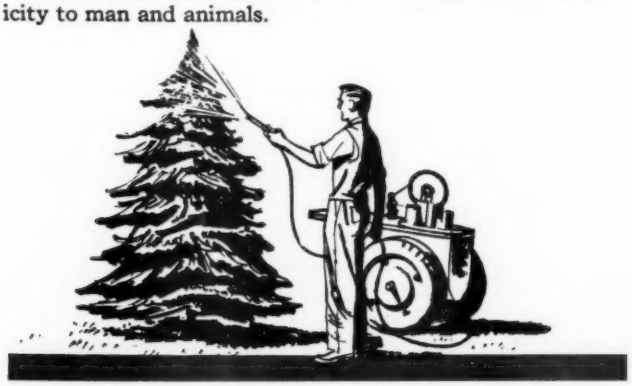

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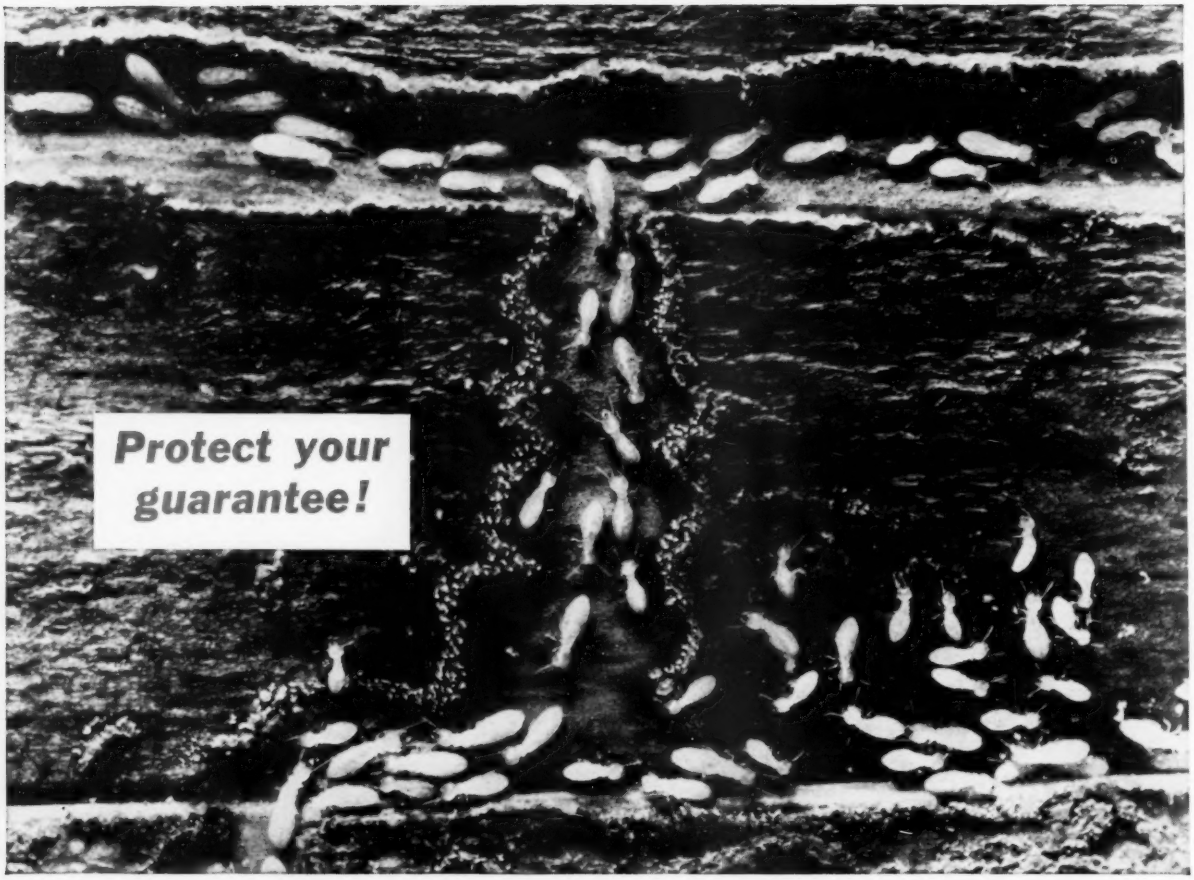

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Choice To Be Made

This month during their annual convention in Detroit, National Pest Control Association members will be asked to vote on a site for their association headquarters, to be known as the William O. Buettner Memorial Building in memory of their first president who also served as executive secretary until his death in 1953. This project has been in the works for three years. Let's look at what progress has been made.

Three cities, Chicago, Washington, and New York, were selected by an original committee. The advantages and disadvantages of each site were studied. Reports came from groups appointed to examine available facilities and buildings, but as might be expected, each group recommended the location it inspected for it was their home ground.

During the Denver convention last year, the NPCA's board of directors voted to locate the building in Washington, D. C., but decided to first obtain an every-member preference for one of the three cities through a mail ballot. Once members had decided on one area, a committee was to buy suitable property in that area if it was okayed by the NPCA's executive board.

An association group proceeded to investigate possibilities in Washington, as well as in Chicago and in the New York city area to which New Jersey was added. Following this committee's study, members were advised suitable buildings were not available in Washington or Chicago, and that purchase of a large English Tudor home in Elizabeth, N. J., was recommended. Then, members were asked to vote for one of the three areas. Although better than 70% of the returns selected the New York-New Jersey district, a required majority preference of the *total* membership was not received, making results invalid.

All this is a complicated history, fraught with delays, but site selection will again be brought to membership vote at the Detroit meeting. Majority preference there, we are told, will be legal and will enable the NPCA to purchase an association building in the place picked.

Pleasing the constituency of an association with members all over the country is no easy job, but we hope a decision acceptable to most will be reached on this important project started three long years ago. Let's get the site agreed upon, wherever it is, the building purchased, and the transition made so the NPCA can begin to expand services with money saved from operating on its own real estate.

PEST CONTROL

EVERY MONTH SINCE 1933

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Letters

Clarifies Termite, Chemical Situation in Australia

In the February issue of *Pest Control* (page 6), you carried a letter from Norman R. Jeffrey, 15 Delando Road, Waratah 2N, N.S.W., Australia, headed "Report from Australia". This is rather an unfortunate letter since the writer apparently lacks much information on some important aspects of the pest control field in Australia.

Mr. Jeffrey complains of large firms having to compete with "ridiculously low prices and three to five year guarantees" of the "back yard merchants". Actually, firms that charge reasonable fees do not have worries in this direction, and it is only those who quote exorbitant prices, whenever they think they can hoodwink the householder, who have reason to be unhappy about the smaller firms.

Four termite species are mentioned by Mr. Jeffrey as being economically important. This listing is only partly correct.

Among termite species causing damage to buildings, "*Coptotermes acinaciformis* is probably responsible for greater economic loss, in the aggregate, than all other Australian termites put together" (Ratcliffe, Gay and Greeves, "Australian Termites", 1952). It is responsible for virtually all damage to buildings in and around Sydney and Adelaide. *C. acinaciformis* is also reponsible for most attacks in country towns of New South Wales and other states. It is often a mound-builder in the far north of Australia, but has not been known to construct mounds south of latitude 20° S.

Coptotermes frenchi is chiefly a forest pest, infesting living trees in the hardwood forests of Victoria and New South Wales. At times it is responsible for a considerable amount of damage to wood structures in southern N.S.W. and eastern Victoria.

Coptotermes lacteus is typically a mound-builder feeding on dead wood in the forest. Only occasionally does it damage living trees, and apart from attacks on fence posts, poles and odd timber structures in areas where it abounds, it appears to be of negligible economic importance.

Schedorhinotermes intermedius (including five sub-species) is a highly destructive species, surpassed only by *Mastotermes* and *Coptotermes* in economic importance. It damages timber in buildings, poles, fence posts, etc., is sometimes found in the pipes of living trees, and occasionally damages economic crops. This species is found in part of Western Australia, the Northern Territory, and the eastern states, with the exception of the south-east corner of the continent.

Mr. Jeffrey omitted to mention another termite species which does considerable damage to buildings in rural areas, fence posts, poles and bridge timbers. The termite is *Nasutitermes exitiosus* (F. Termitidae), and it is of considerable economic importance. Around Canberra, in the Australian capital territory, it is responsible for most of the damage to timber in buildings. This species has a wide distribution range.

The statement by Mr. Jeffrey that the nest must be located before treatment can be carried out is erroneous, and he in fact contradicts himself shortly after making the statement. If the nest is indeed located, treatment is a simple matter, and the introduction of poison dusts into galleries some distance from the nest would be only an indirect approach to eradicating the colony. However, in built-up areas, the nest is seldom located, but successful treatments with poison dusts are continually being carried out. The poison dust itself is picked up on the bodies of the insects from the walls of the workings and a lure, if such existed, would hardly be of any benefit. Grooming within the colony is carried out even

(Continued on page 76)

Pest Control welcomes expressions of opinions from its readers. Send ideas and comments as briefly as possible to James A. Nelson, Editor, Pest Control, 1900 Euclid Avenue, Cleveland 15, Ohio.

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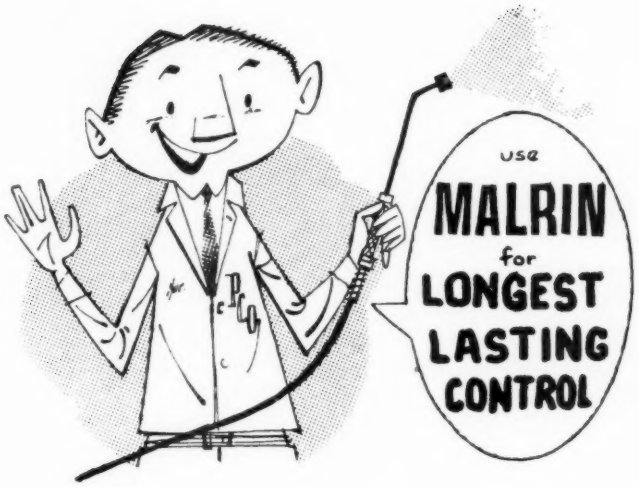

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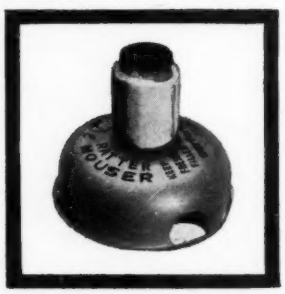

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HOW MUCH is my pest control business WORTH?

Special Pest Control magazine report based on interviews with leading PCOs

An analysis of methods used in the pest control industry to determine sale value of an established firm

If I were to sell my business, or wanted to buy one, how much should I expect to get or expect to pay? Is there any standard method for placing a value on a business in this industry?

These are questions asked repeatedly by fair-minded PCOs who want to sell out or want to expand by acquisition. There doesn't seem to be any standard procedure for setting the worth of a pest control business, so the editors of **Pest Control** set out to see how determinations were actually being made.

• The Big and The Small

If a set purchase price is offered, protection of your investment usually depends upon whether the business is a one- or two-man show, or a well integrated organization.

An eastern operator told us he's lost as much as 65% of the customers he's purchased from individual operators during the first six months. But with companies employing four or more servicemen, with routes in five or six towns, he's found 75 to 80% of the accounts will be retained.

In this service industry, as in most others, an owner's individual reputation is the keystone of his success. Customers usually have come to know and like "Mr. Joe Owner," and because they are pleased with the work his organization does, they stick with him. Some don't want anyone else but Joe Owner to service their property. Even though Mr. Owner's company may be known as XYZ Pest Control Service, Joe is the one everyone associates with XYZ.

What happens when Joe Owner dies? Or if he decides to sell out? Will the accounts still stay with XYZ Pest Control Service?

Usually Joe was born and raised in the town. He knows all the merchants, buys meats and groceries from his various accounts. The baker is a fellow lodge brother; the grocer is a member of his church; the butcher is his second cousin; the realtor was in his class in high school. Even though Joe may have one serviceman who knows the customers just about as well, the helper usually hasn't the cash Joe wants for his business. How much is his business worth?

Setting a price on such a personally-run business depends on how big a role the owner plays in the company's management and service. Joe Owner may gross $15,000 a year because he services most of the accounts himself and has his wife work in the office. To him, his business is worth $15,000 or more. To a prospective buyer it's worth considerably less. Maybe it's not worth anything at all.

Once Joe Owner leaves, the stability of XYZ's service routes is in jeopardy. His customers, who are not bound to stay with any new owner, become easy prey for most of his competitors.

The value of a business also depends on how long it has been established, how well it is managed, how efficiently its service routes are manned, the condition of its equipment, the number of guarantee commitments it has, and how well the company is known as an entity unto itself. Another very important consideration, of course, is the number of competitors in the area served by the company up for sale. If there is no competition, it can command a higher price than if there are nearby firms which could service the accounts just as well.

Other equally pertinent questions to answer are: Has the seller a contract with his employ-

ees to preclude their entering into competition for a reasonable period of time? Can present employees be trained in your methods? Are there leases in effect, advertising under contract, other liabilities? What is the age of existing contracts? What is the grading of contracts in relation to the price charged and the service required for them? What is the geographical location of customers; are they grouped or in scattered areas?

Then, there's the shrewdest question of them all: Why is the company up for sale? There are a number of good reasons - sickness, age, competition, wants a change, etc. -, but a new owner usually inherits a firm's bad reputation, too, if one exists.

• Gross Volume Basis

Many attempts have been made to determine the value of a pest control business on the basis of its gross service or route dollar volume alone.

A Texas operator says, "I've followed an old rule of thumb that a pest control business is worth about 10% of the yearly contracts in force, plus an inventory of materials and equipment, which are usually mostly junk." He admitted he's purchased many concerns on this basis but added, "I cannot say such deals were profitable except that they might have gotten a nasty competitor out of the way, but then another would soon appear to take his place."

An expanding midwestern owner reported he'd offer 50% of the past year's gross if the seller's company had a good sound monthly service business and the contracts are in good standing. But first he subtracts the termite work from general pest control service. "I'm never happy about termite work, for the seller has usually collected all the money already and we assume all the headaches," he said.

Explaining further his lack of interest in the worth of buying termite contract experience, this operator said, "If the firm has an annual amount of deferred payments coming in from past termite jobs, and has yearly reinspection contracts on each and every job it's completed, we will offer 25% of one year's gross on such work. If there are only a few 'paying' annuals and the rest free, I'm not interested. . . .

"I purchased one business in an adjoining state that had over 200 yearly termite contracts on its books, with about 20% paying annual fees. We discovered we had to spend over $10,000.00 to go over almost every house again. I'm very happy now that we did take care of these badly-serviced contracts for our business has doubled in that territory since. But I'll never enter into another buy-agreement like that."

When it comes to acquiring equipment, this midwestern firm pays 20% of its value "providing it isn't all shot."

The president of a western pest control company said he has paid 50% of the annual yearly pest control contracts. In other instances, he's paid 50% plus a fair and mutually agreed upon price for equipment and materials.

This successful owner also devalues the worth of past termite sales. "Oftentimes the gross will include termite work. When it does, we deduct that figure as we feel it is a liability because we must keep a certain number of those jobs under observation and retreat, if necessary, for the guarantee period."

Another method this western executive uses is based on net profit. "We look at the average net profit over a five year period. With that figure, and its percentage of gross income, we then check into the manpower: the number and type, etc. We know from our own experience whether or not we can realize the same percentage or better on the gross. Usually we can, or we can by making certain changes. Once we determine that, we have paid up to five times the net," he said.

"Just to confuse the issue," he added, "we'll pay more or less depending on who it is, where it is, how bad they want to sell, and how much we want it."

One of the larger eastern firms reported, "Every pest control company we have tried to purchase was overpriced. . . . In buying a pest control business, it is very helpful if you can review the company's most recent income tax return. In most cases, the balance goes down in favor of the purchaser."

When the true gross has been determined, the president of this company reveals, "We will pay an individual or organization an amount approximating one-third of the gross yearly income on service accounts. We assume we'll lose about 20% of the business in 12 months. In addition, we will pay the approximate value of any equipment, trucks, materials, or supplies that we can utilize in our operation."

Still another executive points to the advantages of estimating what the potential is for the next five years resulting from both established contract customers and from new business. This appraisal takes into consideration the probable cancellations and diminishing returns from old customers which should be deducted from estimated gross receipts. He says an effort should also be made to determine the apportion-

(Continued on page 66)

"You can always spot a man going out of business, sir . . . he always cuts his prices to below cost."

Walter Winchell accepts gift of $25,000 from Ralph G. Martin, president of Real-Kill, Inc.

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what effect does

temperature

have on insecticide TOXICITY?

by **Robert A. Hoffman,** Entomology Research Branch, Agricultural Research Service, U. S. Dept. of Agriculture

EFFECT of temperature on the mortality of insects exposed to insecticides has been the subject of numerous investigations over the years. However, little attention has been given to the practical aspects of this relationship, which would seem to be of considerable value to pest control operators. To stimulate interest in this direction, a few of the results and observations of workers who have contributed to this complex problem will be presented here.

It should be realized, of course, that temperature is only one of the variables that may affect the toxicity of an insecticide, and that humidity, sunlight, species of insect, developmental stage, and quantity or quality of food also exert considerable influence.

• Two Toxicity Factors

At least two factors are represented in the toxicity of an insecticide: (1) the speed and extent to which the poison is absorbed by the insect and acts upon its tissues, and (2) the speed and extent to which the poison is eliminated by detoxification or excretion. The end result is most likely an interaction of chemical, physical, and physiological changes for which temperature is one of the motivating forces.

• 50-95° F. Most Favorable For Insect Mortality

With the common fumigants it has long been recognized that, other conditions being equal, temperatures within the working range of 50° to 95° F. generally produce the greatest mortality of insects. According to Strand[1], when the temperature was decreased from 95° to 77° F., the time required to obtain kill of confused flour beetles with carbon tetrachloride was increased approximately six times, with carbon disulfide three times, and doubled with chloropicrin.

Jones[2], using carbon disulfide for the control of wireworms, found that for every 10-degree drop in temperature it was necessary to double the concentration in order to maintain an LD-50. Below 50° F. the fumigant becomes more effective as the temperature decreases. This effect appears to be due to a reduction of the insect's metabolism and low concentrations of the fumigant.

With arsenicals, an increase of mortality has repeatedly been correlated with an increase of temperature. Fleming and Baker[3] confined Japanese beetles to smartweed treated with lead arsenate and demonstrated 38.7 per cent mortality at 65° and a 65.8 per cent at 85°-89° F. Hasting and Pepper[4] dusted Mormon crickets with sodium arsenite and found that the time required to produce an LD-50 was 31.5 hours at 59°, 17 hours at 68°, 9 hours at 77°, and 7 hours at 86° F.

On the other hand, there is evidence that low post-treatment temperatures have sometimes resulted in greater mortality where marginal doses of the insecticide have been used. Ellisor and Blair[5] obtained about twice the toxicity with calcium arsenate or basic copper arsenate at a holding temperature of 60° F. as they did at 80° in tests with larvae of the southern armyworm and the velvetbean caterpillar.

Since the introduction of DDT and other new insecticides of the chlorinated hydrocarbon and organophosphorus groups, new interest has developed among researchers concerning the mode of action of toxicants. DDT especially has received marked attention. However, with the possible exception of the organophosphorus toxicants, the modes of action are still in doubt.

The discovery by Lindquist **et al.**[6] that house flies were more susceptible to DDT at 70° than at 90° F. stimulated additional research on this phase of the mode of action of DDT. Other workers verified these results with house flies and added data on several other species. Lindquist **et al.**[7] demonstrated the same phenomenon to be true for adult mosquitoes and bed bugs; Potter and Gillham[8] and Pradhan[9] obtained a higher mortality of grain beetles at lower temperatures after treating with DDT solutions; Richards and Cutkomp[10] and Yates[11] obtained a greater kill of mosquito larvae at lower temperatures on immersion in dilute suspensions of DDT; and Guthrie[12] found DDT topically applied to German cockroaches about 20 times more effective at 90° than at 58° F.

• Negative Temperature Coefficient

In 1948 Fan **et al.**[13] demonstrated in the laboratory that low concentrations of DDT were more effective on mosquito larvae exposed at low temperatures than at high, and called this relationship a negative temperature coefficient. At high concentrations, however, they obtained greater mortalities at the higher temperatures, and also when the cuticle was bypassed by injecting DDT into the larvae a positive temperature coefficient was obtained regardless of the amount used. This led to the suggestion that the negative temperature coeffi-

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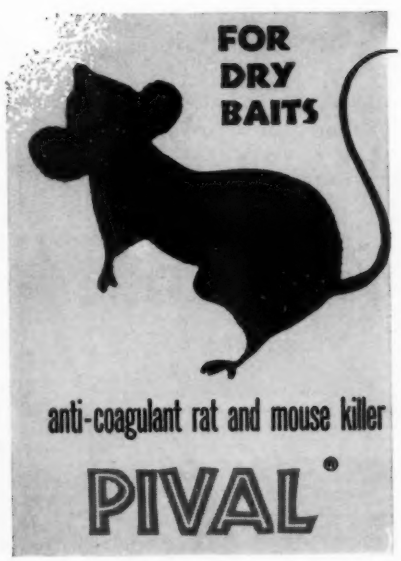

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cient is due to the greater DDT-concentrating action of the insect cuticle at lower temperatures. However, with the milkweed bug[14] and the American cockroach[15] it has been demonstrated that a negative temperature coefficient may exist even when the cuticle is bypassed.

Several theories have been advanced to explain the mode of action of DDT in relation to temperature. Hurst[16] has suggested that DDT in the cuticular lipides can act on the peripheral nervous system only when it is removed from solution by cooling. This would imply the cuticular lipides block the passage of DDT to the sites of action at low temperature, but assist its passage and act as a reservoir in competition with the site of action at high temperature.

Work by Vinson and Kearns[15] on the absorption and metabolic fate of both topical and injected DDT, in which the reversibility of DDT-poisoning symptoms was demonstrated with changes of temperature, led them to conclude that "an explanation must be based largely on the effect of temperature on the intrinsic susceptibility of some physiological system to DDT." These and other studies by Sternberg and Kearns[17] point to the presence in the haemolymph of a toxic substance that increases or decreases in correlation with the effects of temperature on the appearance and disappearance of poisoning symptoms.

In any event it is clear from the investigations with DDT that no simple action is responsible for its toxic response in relation to temperature, but instead a combination of occurrences stimulated by temperature and probably other factors, both during and following treatment.

• Not Too Much Work Done On Insecticides Other Than DDT

The effect of temperature on phosphorus and chlorinated hydrocarbon insecticides other than DDT has not been investigated so thoroughly. Hoffman and Lindquist[18] showed that methoxychlor and TDE also exhibited negative temperature coefficients in their action against house flies. However, other chlorinated hydrocarbon insecticides probably have positive temperature coefficients. Hoffman and Lindquist[18] exposed house flies to residues of heptachlor, chlordane, aldrin, dieldrin, and toxaphene, and obtained higher mortalities at 90° than at 70° F.

Apparently lindane responds to a lesser degree with a change of temperature, although the results have varied considerably with the insects and techniques used. Guthrie[12] in experiments with German cockroaches found that lindane was about twice as toxic at 58° as at 90°. Hoffman and Lindquist[18] demonstrated little difference in toxicity of BHC to house flies at 70° and 90° F. Experiments on sheep ticks with this toxicant by Hoffman **et al.**[19] indicated a moderate tendency toward a positive temperature coefficient. Although the evidence available, including that on temperature effects, indicates fundamental differences in the poisoning procedure of lindane and DDT, no definite mode of action has been determined for either material.

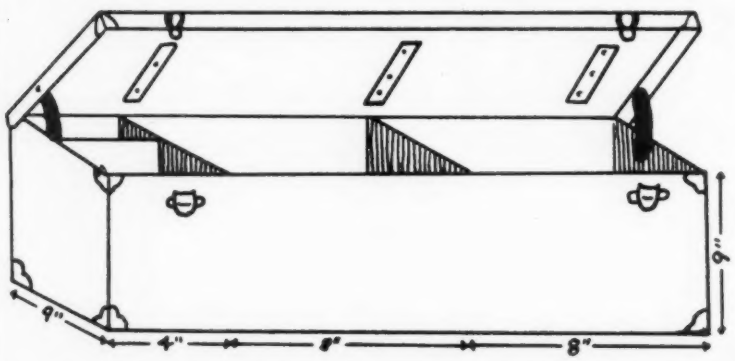
The effect of temperature on toxicants of the organophosphorus group has been studied only to a very limited extent. Residual treatments of parathion were more toxic to house flies at 90° than at 70° F. in tests by Hoffman and Lindquist[18], and malathion was shown by Rai **et al.**[20] to be progressively more toxic to topically treated house flies as the temperature was increased

(Continued on page 80)

Servicemen's Suggestions Built This Service Kit

Wilbert J. Marchand, serviceman in Orkin's Baton Rouge, La., office, says he likes the new Orkin service kit because of its convenience. "A lot of my stops are in the downtown business section, so I often have to use parking lots. With my kit in one hand and spray gun in the other, I can carry all the supplies I need for several stops. The kit is light and durable and gives me a business-like appearance." (from "Orkin Talkin", June, 1956).

A pooling of service personnel suggestions to the Technical Department of Orkin Exterminating Company resulted in the design of a new easy-to-carry service kit for use by the company's field men. Made of lightweight, sturdy pressed board, metal reinforced at the corners, the four-compartment kit is 20″ long, 9″ wide, and 9″ high (see diagram). A small plastic dispenser, a can of dust, a flashlight and tools are stored in the two 4″ x 4½″ x 9″ compartments at the left. The two 8″x9″x9″ sections accomodate a bulb duster, and small chemical containers. This smaller and more compact kit than those formerly carried by Orkin servicemen, costs the company in the neighborhood of $8.00 each.



Drawing of Orkin service kit shows dimensions of four storage compartments

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NEW BUILDINGS...

Are they more favorable to structural pests?

By **Dr. Harvey L. Sweetman,** Department of Entomology, University of Massachusetts, Amherst

THE environment within and around structures man builds determines the suitability of such buildings for the survival, development, and increase in abundance of pests that may gain entrance. The more important environmental factors that control or influence numbers and abundance of pests in buildings are temperature, moisture, food availability, and a place to live. There is considerable variability in these environmental factors between new buildings, medium-aged buildings, and buildings approaching 50 or more years of age. Consequently, the abundance of various structural pests will vary considerably depending upon a structure's age.

• Importance of Temperature

Temperature is very important since every arthropod responds similarly to this factor. Arthropods are cold-blooded organisms including insects, ticks, mites, spiders, sowbugs, millipedes, centipedes, scorpions and similar organisms with jointed appendages. The response of arthropods to temperature is represented diagrammatically in Table 1.

The firebrat, **Thermobia domestica** (Pack.) (Sweetman 1938), is used here to illustrate the temperature response in general of structural pests. It has an optimum temperature near 98.6° F. The effective temperature zone, i. e., where the species can maintain itself, lies approximately between 87.8° and 109.4°. Below or above these limits, the firebrat is sooner or later eliminated.

The shortest life cycles will occur under or near optimum conditions and consequently many develop. Above the optimum, adequate development tends to be somewhat slower and the percentage completing development becomes less and less. Near the lower limits of the effective zone, the period of development becomes 12 to 20 times or more the length of that at the optimum temperature. In this range insect populations become greatly reduced.

Every cold-blooded organism responds to such a temperature scale. However, each species has a different specific scale. For example, the brown-banded cockroach responds best at 82.4° to 86°, the bedbug to about 75.2°, and the larder beetle to 64.4° to 68° F. (Gould & Deay 1940, Johnson 1940, Kreyenberg 1928).

Since temperature conditions in buildings or portions of structures vary considerably, different pests will find different buildings, and varied locations within structures, suitable to their temperature needs. New buildings are apt to have a utility room with central heat, uniform heat distribution, good insulation, storm sash and weather stripping to resist air infiltration, and often summer air conditioning. The utility space is warm or hot throughout the year. The insulation prevents rapid changes in temperature. This is a good place for heat-loving pests.

• Arthropod Moisture Scale

Moisture is likewise an important portion of the environment. The moisture scale for arthropods is represented in Table 2.

Here again, the firebrat (Sweetman 1938) is used to illustrate

TABLE 1. Response of Arthropods to Temperature

	Temperature Scale	Approximate response of the firebrat T °F.	Developmental response
	Unfavorable zone	111.2+	Eradication
Effective zone		107.6-109.4	3 months, low numbers
		104-105.8	3 months, moderate numbers
	Optumum zone	98.6-100.4	2-3 months, numerous
		93.2	1 year, moderate numbers
		89.6	2-3 years, low numbers
	Unfavorable	78.8—	Eradication

TABLE 2. Moisture Scale For Arthropods

	Moisture scale	Approximate Rel. Humid.	response of the firebrat Developmental response
	Unfavorable zone	97-100	Eradication
Effective zone		92-96	Moderate numbers
	Optimum zone	75-90	Numerous
		62-70	Moderate numbers
	Unfavorable zone	60 & below	Eradication

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the response of arthropods to moisture. They respond best to a relative humidity of 75 to 90%. The number of firebrats successfully maturing in relative humidity of 92 to 96% declines sharply from that in optimum moisture conditions. The pest is slowly eradicated when the relative humidity approaches saturation. The proportion of offspring surviving below 70% becomes less and less, until the species is eliminated in dry environments below about 60% relative humidity.

Every cold-blooded organism responds to such a moisture scale, as to the temperature scale discussed previously. Again, each species has a different specific scale, which meets its particular moisture needs. The optimum zone may be near saturation as with fruit flies, **Drosophila** sp. and the subterranean termite, or around 50 to 60% as with the furniture carpet beetle (Kreyenberg 1928). The effective zone varies with the species and may be quite wide or relatively narrow.

Moisture conditions vary within structures and between buildings, so that one building or a portion of a structure may be favorable for some species and less favorable to others. New buildings are very moist because of unseasoned lumber, plaster, mortar, moisture in bricks, masonry, etc., and additional moisture is added through normal household operations (NPCA 1955).

Insulation usually retards loss of moisture and tends to influence the position of the dewpoint temperature in the northern two-thirds of the United States, generally keeping it nearer the outer wall. Slab floor construction tends to increase moisture conditions.

New structures are noticeably moist from two to four years after construction. The abundance and wide distribution of moisture makes it easier for pests to locate favorable moisture situations within a suitable temperature range. Thus, pests like silverfish, springtails, booklice, roaches, sowbugs, millipedes, centipedes, and fungi, that require moist conditions and find a food supply more readily available in such situations, may become very numerous and conspicuous.

As a building gradually dries, moisture-loving pests tend to withdraw to more favorable areas. With further drying, these pests gradually become isolated into smaller and smaller areas and their numbers reduce and finally become eradicated in some or all locations.

Dr. Sweetman is an authority on insect habits.

• Food Supply Plentiful In New Buildings

A food supply, which is very important, is very plentiful in new buildings. Pests normally feed on dead or live insects, crumbs and scraps, stored supplies inadequately protected, sugars and starches in wood, paper products, cellulose, fabrics, bacterial rots, yeasts, molds and fungi, and other materials. Even new buildings, which are relatively clean, furnish ample food for a variety of pests.

High moisture conditions encourage the growth of microorganisms, as yeasts and fungi, which are rich in vitamin B complex and contain nutritive elements essential to insects. Moisture renders the starches in wood readily available to the microorganisms and to a number of insects which invade new homes.

A home's general newness or cleanliness favors some pests, which may be harmed by their own wastes. Others, like bed bugs, roaches, and flies, which are attracted by their own odors and wastes, are not repelled by cleanliness, since they soon produce areas satisfactory for their needs. These conditions permit the rapid development of insect populations with the subsequent abundance of dead carcasses to meet the needs of scavengers such as carpet beetles, carpenter ants, and others.

As structures lose moisture, the food supply created by such conditions becomes reduced and many pest populations dependent upon this food may become decimated or exterminated.

New buildings, just because they are new, are in no way immune to invasion by pests. Some are brought in with building materials. Others enter with food products, furniture and similar household goods. Many can readily gain entrance through small cracks and crevices. This was demonstrated in an earlier report in this magazine (Sweetman 1943). However, so many more pests successfully enter new buildings than succeed in establishing themselves, that the problem of entrance is a minor one in most cases. This is true regardless of the structure's age since it seems certain numerous arthropods successfully enter both new and old buildings.

New buildings have or seem to have more pests because they offer unusually favorable temperature and moisture conditions with ample supplies of a variety of food. Data is not available from which definite conclusions can be drawn. However, more pests may be present or the greater abundance of a smaller variety of species may render them more conspicuous, so that more species may be seen or simply greater numbers of fewer species are evident.

• Many Species Vanish As Structure Ages

As a building ages and moisture conditions become greatly reduced, certain pests that may have been abundant for two to four years become less numerous and are often eliminated. The drier conditions in older structures are suited to relatively fewer new species, although a number of those that were present in the new structure may continue to thrive at least in portions of the buildings.

As buildings age, cracks and crevices in the wood and concrete become more numerous and larger, insulation shifts and settles leaving unprotected areas, and air currents penetrate more freely. Pests have more freedom to move in and out, but this may be of little importance, since most species enter new as well as old buildings freely. The annual accumulation of debris, as lint, hair, dead insects and other animals, etc., and

(Continued on page 84)

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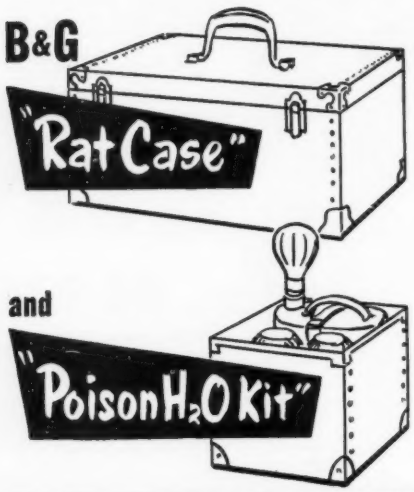

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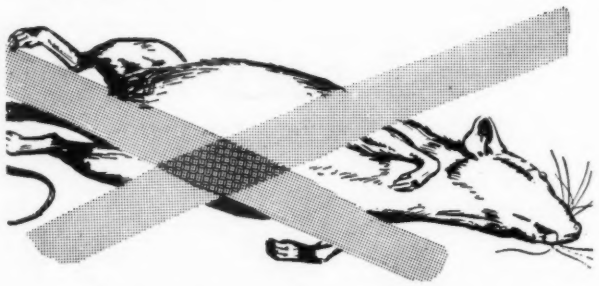

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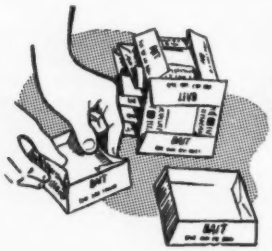

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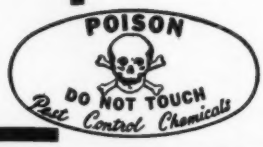

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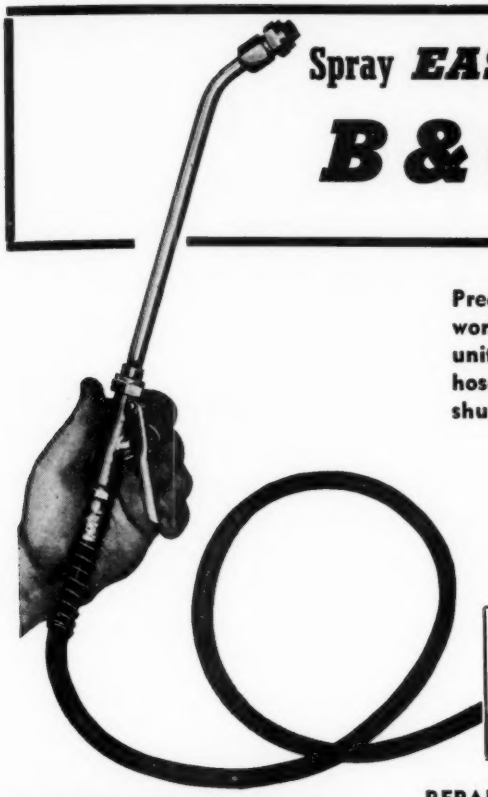

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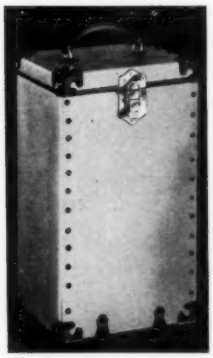

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Executive personnel of Industrial Fumigant Co. meet periodically to review company sales. Seated is **Mrs. L. R. Rukin,** president and treasurer. Grouped behind her, left to right are **Glenn Munger,** sales manager; **T. F. Winburn,** vice-president; and **M. S. Buckley,** entomologist.

From a $34,000 gross in 1937 to a corporation presently doing an annual business of $1.5 million, that's the story of Kansas City, Missouri's

Industrial Fumigant Company

BY PHIL OSBORNE

WHEN auburn-haired Lavonne Rukin appears for work Saturdays in cotton toreador slacks and matching blouse, she may look the part of a housewife fresh from the supermart. But in reality she is president and treasurer of the Industrial Fumigant Company, a $1½ million a year corporation founded in 1937 by her late husband and specializing in pest control services for food processing and storage plants.

Today, Industrial Fumigant owns 800 square feet of office and 8,000 square feet of warehouse space in Kansas City, Mo., where its $100,000 central office is located, and leases or rents branch offices in Portland, Ore.; Crowley, La.; Ft. Wayne, Ind.; and Chicago, Ill. Administrative and clerical personnel number 15, fieldmen, 30. Yet 19 years ago when Max Rukin left Stone Chemical Laboratories in Chicago to form "Infuco", he was his own staff and his working area was a desk in another firm's office.

Following a $34,000 gross the first year, however, Industrial Fumigant's cubbyhole confinement was no more. On April 1, 1938, Rukin incorporated his Chicago enterprise, naming Mrs. Rukin, at that time Lavonne Reeves, vice-president and S. J. Goldstein, now the company's secretary and legal advisor residing in Chicago, secretary-treasurer. A short time later Mr. and Mrs. Rukin were married.

A year after the founder's death in a Minneapolis industrial accident in 1945 and Mrs. Rukin's ascension to the presidency, T. F. Winburn was brought into the organization as vice-president and general manager to direct the field activities Rukin had administered. Winburn, the same variety of individualist Rukin was, headed the research effort for Commodity Credit Corporation's Ever-Normal Granary program from 1939-41, while employed with the U. S. Department of Agriculture's Bureau of Entomology and Plant Quarantine at Manhattan, Kas. Company entomologist M. S. Buckley was hired in 1947, and Glenn Munger, Winburn's assistant, joined the staff in 1952 as sales manager.

"Our executive staff is highly specialized and each has been hand-picked," Mrs. Rukin observes, "but servicemen in our company can become branch managers if they prove themselves skillful at managing people and the business in their territories."

• Most Servicemen Have Degree

Nine out of ten servicemen are university graduates, preferably with a science degree and a more than middling knowledge of entomology first and chemistry second. But occasionally a non-graduate will filter into the group if he owns a broad technological background and several years of practical experience acquired from a competent industrial pest control company. Following an interview to determine the applicant's capabilities, a hiree is apprenticed to an Infuco serviceman for a year to 18 months. Once graduated from his internship, the freshman representative is equipped with a new Ford and a two-wheel covered trailer out-

Present Industrial Fumigant $100,000 central office combines 800 square feet of office with 8,000 square feet of warehouse space. Fifteen administrative and clerical personnel work in the Kansas City headquarters.

E. J. Andrews, warehouse manager for Industrial Fumigant Company's Kansas City home office, pulls a two and one-half ton flatbed truck up to a pile of drums behind the company's building at 923 State Line Ave.

fitted with a motor and air compressor for cyanide fumigations.

If operating out of Kansas City, which became the general office in 1948, a fumigation team responsible for a territory extending through Iowa, Nebraska and Missouri must be prepared to camp in the field for two and three months at a time during the summer. Best hotel or motel accommodations are provided and winters are taken up with inquiries and contract inspections. Kansas, Texas and Oklahoma are serviced by a Hutchinson, Kas. resident who reports regularly to the Kansas City office.

In addition to the prescribed fleet of vehicles, the branch divisions in Portland and Crowley maintain two service trucks. The Kansas City office has a pick-up and a 2½-ton flatbed, but no actual service vehicles.

"An interview is the only initial testing method we employ," Winburn says. "That for us is the surest way to discover the likes and dislikes of the applicant and to learn if he really knows what he is talking about. Obviously men with only household pest control experience do not suit our needs. This is a specialized industry demanding highly-specialized skills."

• Field Men Grade Own Progress

Normally one field man has charge of each territory. Under him is a qualified corps of service and sales people. Although servicemen are paid flat salaries, a profit-sharing plan enables them to pick up extra cash benefits at the end of the year. They grade their own monthly progress by points and submit the record to Winburn and Munger, who are familiar enough with each serviceman's capacity to know whether he is over-estimating or underrating his abilities. If the serviceman's report as he organizes it is not quite compatible with the company's judgment of his efforts, Winburn, Munger and the employee in question put their heads together at the general office, where they diplomatically iron out any inconsistencies of opinion.

• Annual 5-Day Sales Meeting

One of the other rare occasions when field men visit the Kansas City office is to attend the annual company sales meeting, convened usually in January or February. Purpose of the five-day caucus is to familiarize Infuco's members with latest advances in equipment and procedure and other technochemical improvements within the industry as well as the problems likely to culminate from new untried methods of production.

Outside speakers including customers and suppliers are often imported for the occasion. The last sales meeting, attracting 100% of the company's far-flung personnel, was held in February with a representative of the Lawrence Lighter Company of Kansas City delivering the keynote address.

In addition to Industrial's profit-sharing incentive, commissions of up to 5% are awarded field men for product sales, a valuable source of revenue furnishing 65% of the company's income. Mrs. Rukin explains that before Infuco began formulating its own insecticides and jobbing for larger chemical suppliers late in the 1940's, fumigation assignments, being on-again, off-again according to season, gave business cycles too much of a "poor man, rich man" heterogeneity.

That was because demand for

knock-out the **odor** in Insecticides and other strong-smelling Chemical Specialties with **CHLORSCENT**

CHLORSCENT was especially developed to quickly, efficiently and economically cover and neutralize the unpleasant odors so often present in insecticides and other chemical specialties used in pest control operations. Why not test CHLORSCENT in your own products. We'll be glad to send a free sample on request, or ship you a pound at the low, low price of $1.60.

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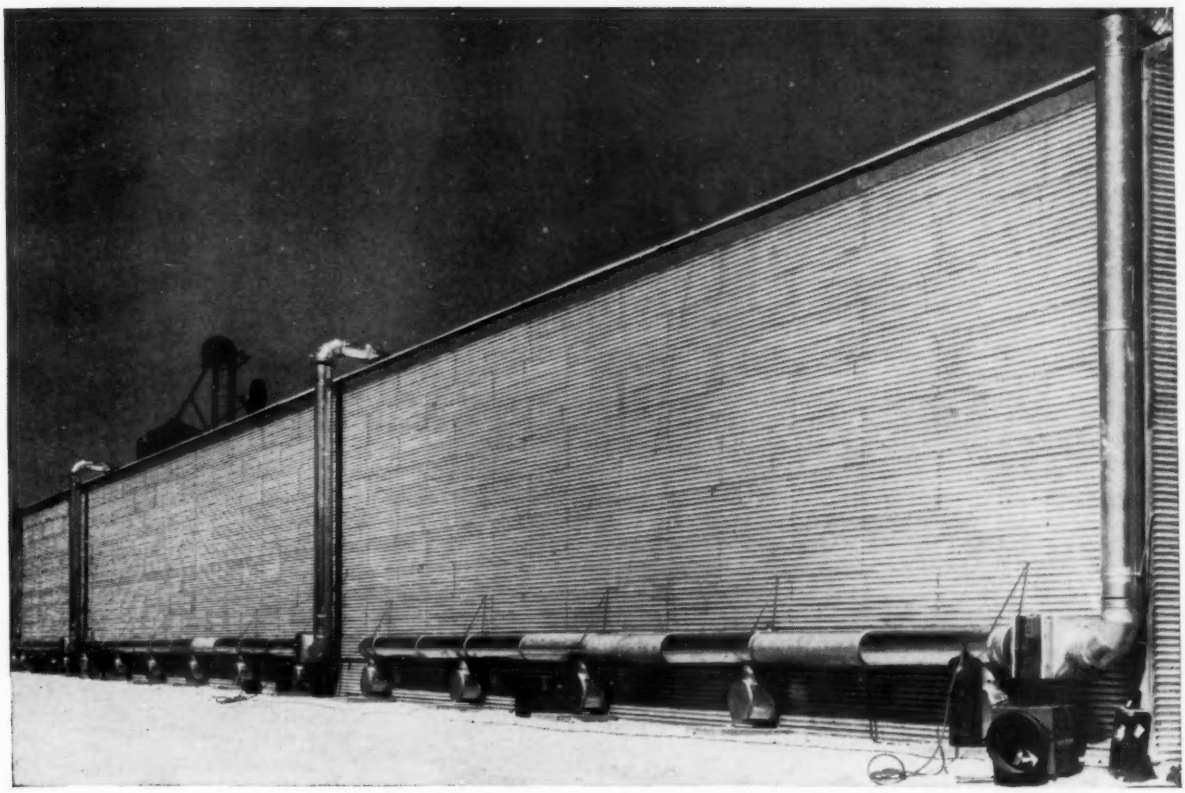

Fumigation of stored milo by recirculation method. Structure housed approximately 100 carloads. Dow assisted P.C.O. Gentry Williams (James Thomas McRaw Co.) of Corpus Christi, Texas. Photo taken at Golden Grain Co., Taft, Texas.

METHYL BROMIDE RECIRCULATION METHOD

Fast, highly effective way to fumigate grain cuts materials cost 50%

FORCED RECIRCULATION of methyl bromide enables you to make an exact science of fumigating grain and other bulk commodities. Originally developed for silo type storage, this Dow adopted method has also proved effective for quonset buildings, gas tanks, freight cars and a wide variety of other structures.

Basically this method consists of a fan and duct system which circulates the fumigant vapor through the bulk piled commodity. In many structures it is relatively simple to convert standard aerating systems to recirculation systems. Controlled dosages, complete and rapid distribution of the fumigant mean better results at far less cost. After the necessary exposure period—usually 24 hours—the fumigant can be removed quickly with the same equipment. The whole job in most cases can be completed over the week end, or in 30 to 40 hours.

Eight years of Dow know-how in developing and engineering this proved method of fumigation is available to assist you in applying it to your stored commodity accounts. Trained experts have acquired their experience from working on some of the largest, most complex jobs in the country. Materials and consultants are available from most any of our sales offices. Write for further information and technical assistance to: Fumigant Sales Section, THE DOW CHEMICAL COMPANY, Midland, Michigan.

you can depend on DOW FUMIGANTS DOW

fumigations occurs in the summer when insects emerge from their dormant stage of development. In the winter, the degree of infestation is not evident and, therefore, cannot be measured and/or treated.

• Monthly Sanitation Letter

Since most new customers are obtained through trade journal listings and personal inquiry, advertising by Industrial Fumigant is confined essentially to convention display and a sanitation letter mailed out once monthly to customers as well as non-subscribing grain and milling interests. Information contained in the handsomely illustrated four-page letter, undertaken by Munger in 1952 when the company's Sanitation department was opened, is documented mostly from up-to-date federal research bulletins and expands on an amalgam of problems commonly troubling grain elevator and food processor concerns.

Munger, who received his Masters degree in entomology from Kansas State College, works several months ahead sometimes outlining his topics. As a member of the American Association of Economic Entomologists plus a number of smaller chemist and entomologist groups, he keeps a sensitive finger on the pulse of progress in sanitation. Although originally designed as a subaltern medium of promotion, the letter today is considered one of Industrial Fumigant's best sales agents. In just three years, circulation has grown to 5,000 with mailing, letter services and printing costs on each installment exceeding $300.

"Years ago all a so-called exterminator needed was a sprayer, duster and chemical insecticide," Mrs. Rukin declares. "But today it's an occupation reserved strictly for professionals who have to learn above all else that there's enough business for everyone. We must sell on our own merits and not concentrate upon running competitors down in front of prospective clients. The job is there to do, and it shouldn't matter who does it. The big item is that it gets done."

Munger, by way of backstopping Mrs. Rukin's statement on the breadth of modern day pest problems, estimates $4 billion in crop damage will be inflicted by insects this year, while stored-grain troublemakers will destroy another million tons of wheat. Therefore, the task confronting the country's 4,500 professional entomologists and laboratory technicians like Buckley is anything but unchallenging.

Supplementary to the sanitation circular distributed each month, Industrial Fumigant as another special service inspects plants free of charge in connection with fumigation bids if a treatment is considered necessary. Some are inspected every month under formal contract. Moreover, little added precautions operators can practice to help safeguard their plants against insect infestation are suggested by the company's servicemen.

• Fragment Analysis Service

A major step forward at Industrial Fumigant six years ago was taken with the installation of facilities in the company's laboratory for chemically determining the degree of infestation in wheat through fragment analysis.

"The introduction of fragment analysis tests opened up a whole new department in the company,"

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Progressive P.C.O.'s use warfarin bait

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Wisconsin Alumni Research Foundation. P. O. Box 2217, Madison 1, Wisconsin.

Munger says. "We're now conducting about 25 analyses a week, and the yearly volume is up about 400 or 500% from what it was in the first year."

The central plant of Industrial Fumigant at 923 State Line Ave., heart of the Kansas City, Missouri industrial district, is a modern structure styled out of red brick. It contains five small offices and a large general working area for the management and six girls, a laboratory and a warehouse managed by four company-trained men. The number of "lost" or delinquent accounts, yardstick of a firm's efficiency at the home station, is no problem for Infuco's staff. Mrs. Rukin estimates only ½ of 1% of their accounts are what might be termed lost. Industrial Fumigant was transplanted into the present building in 1954 from another older one at 1020 Woodswether Road just a few blocks from the company's current location.

As evidenced by the cluster of branch offices sprinkled around the country, Infuco's expansion in other territories has been just as rapid the last 10 or 15 years as in Kansas City. The Portland branch and a public warehouse at Spokane, Wash., were added in 1942, the Kansas City office as a branch in 1947, Crowley in 1952, and Ft. Wayne in 1954. Although little more right now than a "phone service", a new plant in Stuttegart, Ark., rice basket of the country where the CCC has so much of its inventory stored, is in an encouraging position for expansion.

• Treats CCC's Mothball Fleet

Besides the government's inland bin sites, Industrial has handled the fumigation of the CCC's mothball fleet since 1954, an operation requiring barges with specially - mounted tank trucks and pumping and metering facilities for applying the fumigant from the barge directly to the grain in the ship's hold. On May 1, Uncle Sam's liberty ship inventory of wheat included 17,917,925 bushels at Jones Point on the Hudson River, 21,447,038 bushels on the James River in Virginia, 25,535,291 bushels at Astoria, Ore., and 15,054,375 at Olympia, Wash. Winburn says vessels at Olympia and Astoria, and the fleet in the Jones River and the Hudson River have been fumigated.

The staff at Industrial Fumigant looks for the new Pure Food and Drug regulations to give the fumigation business a shot in the arm. Beginning last July 1, wheat containing one or more rodent pellets per liquid pint or 1% or more insect-damaged kernels per liquid pint has been condemned by federal warehouse inspectors and subject to seizure unless dealers agree to market the grain in feed channels. That means a dockage on the price varying from 50 cents to $1 a bushel, depending upon the extent of contamination.

Results of more stringent food and drug regulations are evident in Kansas City. Earl Pugh, chief inspector for the Missouri grain inspection department here, said of the 59,570 yard inspections made by that agency in the fiscal year ending June 30, less than one per cent graded weevily. The same applied for the Kansas department, which sampled 47,570 cars.

"The improved quality under tighter food and drug laws has been particularly noticeable in the volume of weevil and rodent

(Continued on page 74)

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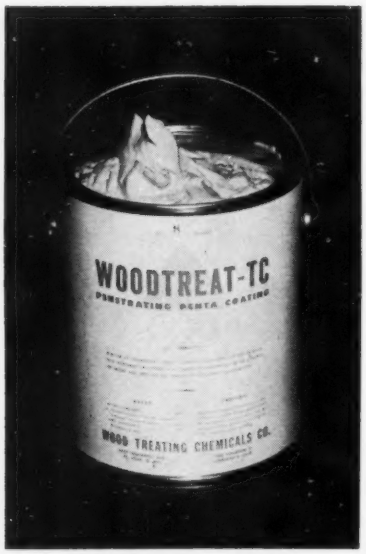


Fig. 1. Bucket of Woodtreat-TC shows consistency of this semi-stable, highly viscous, self-sustaining emulsion now on the market.

Wood Treating Chemicals Co. describes field test studies of its Woodtreat-TC, a new

Termite-Repelling Wood Preservative

By IRA HATFIELD and RALPH VAN ALLEN
Wood Treating Chemicals Company, St. Louis, Missouri

FOR YEARS, termite control operators have been looking for effective ways to apply wood preservatives to timbers and other wood items in existing structures to control termites and other wood destroying organisms.

To date, liquids have been used, and they have been applied by brush, spray, or by drilling holes in the wood and injecting liquids into the bore holes. These methods each have their drawbacks. Spraying never appealed to the TOs because of the vapors produced, and the amount of preservative that could be applied to the wood surfaces at any one spraying was considerably less than the amount required for a deep or thorough treatment. Brushing had similar disadvantages plus the fact that materials would run on to the operators and cause discomfort. The drilling method had sales appeal and in some cases did help get treatment, but the solution spread chiefly longitudinally from the holes and therefore did not treat the entire thickness of the wood. The latter method was also very time consuming and therefore expensive both to the operator and to the consumer.

Purpose of this article is to describe a new coating composition and method of applying the composition to wood. The present product, called Woodtreat-TC and manufactured by Wood Treating Chemicals Co., of St. Louis, Mo., is based upon a patent issued to a termite control operator in California, Wayne K. Davis, of Berkeley's Ailing House Termite Inspection Bureau. Davis perfected a bodied oil-in-water emulsion using pentachlorophenol as the preservative, and had successfully used it in termite control work.

Wood Treating Chemicals Company saw the potentialities of such a product and secured the patent rights so they could do the necessary research to perfect formulations for use in various fields. They first manufactured a less refined product for the ground-line treatment of standing utility poles, and now offer a more refined product, Woodtreat-TC.

Fig. 2. Half inch coating of Woodtreat-TC was applied to this 2 x 8" board to study penetration of the preservative into lumber.

Fig. 3. Bands of Woodtreat-TC, applied at 1' intervals on lumber, were tested for effectiveness in protecting wood from termites.

• Applied As Coating

This product is applied as a semi-stable, highly viscous, self sustaining emulsion (Figure 1), to form a heavy coating up to an inch in thickness on the wood surfaces to be treated. Since the product contains 87% by weight of solvents and carriers containing 10% Penta, and only 13% is water and emulsion stabilizers, it will be seen that almost all of the product is available to penetrate wood. As the oils and penta penetrate the wood, the water evaporates and only the emulsion stabilizers remain on the outside of the wood, where they afford a dry protective film. With such a product, the TO can apply an effective termite control chemical and a wood preservative at the same time and with the same product.

• Laboratory Tests Results

To determine the effectiveness of Woodtreat-TC in penetrating dry lumber which would represent conditions in existing structures encountered by termite control operators some facts were needed. The following laboratory tests were conducted to show the relative penetration properties of various thicknesses of Woodtreat-TC versus some of the superficial methods of application and to obtain a relative value of this type application in terms of equivalent brush coats.

Matched 2" x 8" x 2' flat grain, clear Southern yellow pine, Douglas fir and red oak sections of average density were utilized to measure end as well as tangential and radial penetration. Wood moisture content ranged from 10% to 14%. Where end pene-

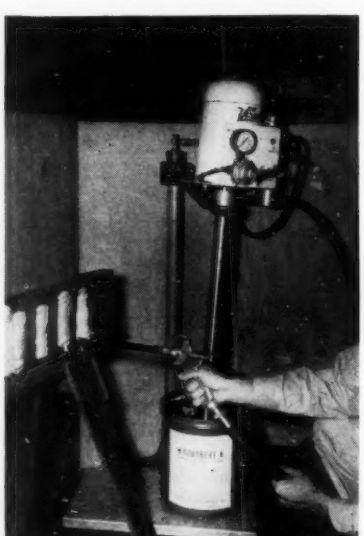
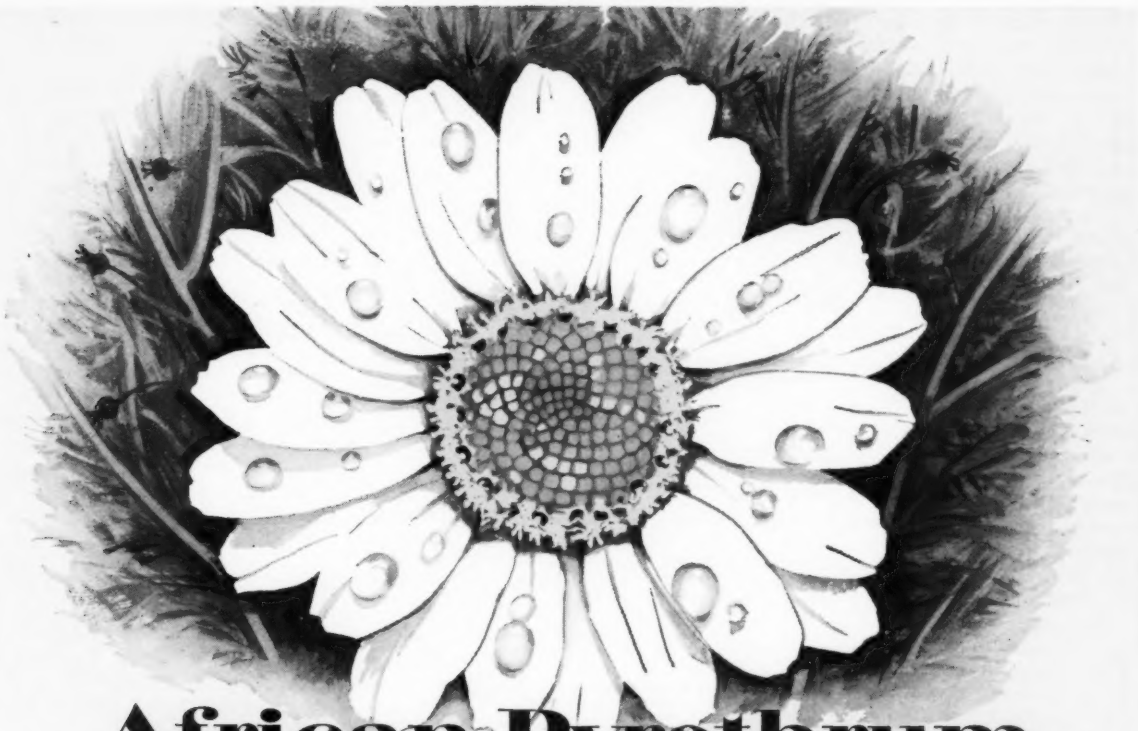


Fig. 4. Lab worker demonstrates Alemite equipment and "handling" device used to apply Woodtreat-TC to joists during tests.



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tration was to be observed, the flat and edge grain surfaces were sealed with three coats of a water dispersion of polyvinyl acetate. Where side penetrations were studied, the end grain was sealed in a similar manner. The solution used for the brush treatments was 5% pentachlorophenol in a range oil or kerosene carrier typical of solutions used in the termite control field.

Two brush coats of the 5% penta-petroleum solution were applied to the end grain of one of a test specimen, 10 brush coats to the other end. Brush coats were applied at the rate of two each day at eight hour intervals. The subsequent matched pieces were treated with 20 brush coats: by a three minute dip, and by an application of 1/16″, 1/8″, ¼″ and ½″ thicknesses of Woodtreat-TC respectively.

Not only was end grain penetration studied, but also the radial and tangential penetration. To the individual matched sections, 2, 10, and 20 brush coats of penta solution were applied for comparison against a section treated by a three minute immersion and with those treated with 1/16″, 1/8″ and ¼″ thickness of Woodtreat-TC. In order that the thickness of the emulsion would be as near uniform as possible, the calculated volume was applied on a weight basis and spread as evenly as possible with a trowel. (Figure 2, page 32). The brush coats were flooded on liberally.

Thirty days after application specimens were sectioned and analyzed for penta by the lime-ignition method. To avoid erronious results, the surfaces of the wood treated with Woodtreat-TC were scraped and brushed before sectioning to avoid having surface residues interpreted as penetration. Results of the analytical work are given in Tables I and II.

A comparison of the results given in the tables shows that for end grain penetration, ½-inch thick application of Woodtreat-TC to the three wood species studied was 5 to 10 times as good as the best of the superficial methods which in this case was 20 brush coats. With the exception of pine, the 1/16, 1/8 and ¼ inch treatments followed a comparable pattern. For flat and edge grain penetration, it can be seen that as little as a 1/16 inch coating of Woodtreat-TC is superior to 20 brush coats of the penta solution on pine, fir and oak at the three 1/8 inch levels.

TABLE I
End Penetration of Penta In Pounds Per Cubic Foot

Application	Depth Analyzed In inches	Specie of wood and retention of penta		
		S. Yellow Pine	Douglas Fir	Red Oak
3 Minute Dip *	2"	0.000	.000	.000
	4"	0.00	.000	.000
	6"	0.00	.000	.000
2 Brush Coats*	2	080	.000	.000
	4		.000	.000
	6		.000	.000
10 Brush Coats*	2	.080	.010	.004
	4	.070	.000	.000
	6	.004	.000	.000
20 Brush Coats*	2	160	.010	.029
	4	.050	.000	.008
	6	.030	000	.000
1/16" thickness WOODTREAT-TC	2	040	.020	.021
	4	.000	.000	.008
	6	.000	.000	.008
1/8" thickness of WOODTREAT-TC	2	128	.024	.020
	4	.000	.000	.000
	6	.000	.000	.000
1/4" thickness of WOODTREAT-TC	2	296	080	.048
	4	.152	.009	.000
	6	.016	.000	.000
1/2" thickness of WOODTREAT-TC	2	.404	.072	143
	4	340	.012	.050
	6	.216	.013	.036

*These applications with 5% Penta in range or kerosene oil type solvent.

TABLE II
Radial and Tagential Penetration of Penta in Pounds

Application	Level analyzed	Specie of wood and retention of penta		
		S. Pine	Douglas Fir	Red Oak
3 Minute Dip*				
Edge Grain	1st 1/8"	0.112	0.050	
	2nd 1/8"	.024	.006	
	3rd 1/8"	---	.000	
Flat Grain	1st 1/8"	.212	.020	.046
	2nd 1/8"	.100	.000	.000
	3rd 1/8"	.056	.000	.000
2 Brush Coats*				
Edge Grain	1st 1/8"	.100	.048	
	2nd1/8"	.008	.000	
	3rd1/8"	.004	.000	
Flat Grain	1st 1/8"	.092	030	.036
	2nd 1/8"	.020	.000	.000
	3rd 1/8"	.004	.000	.000
10 Brush Coats*				
Edge Grain	1st 1/8"	.096	.090	
	2nd 1/8"	.068	.021	
	3rd 1/8"	.024	.000	
Flat Grain	1st 1/8"	.220	.090	.168
	2nd 1/8"	.060	.078	.050
	3rd 1/8"	.048	.006	.017
20 Brush Coats*				
Edge Grain	1st 1/8"	.342	.162	
	2nd 1/8"	.260	.021	
	3rd 1/8"	.048	.009	
Flat Grain	1st 1/8"	.492	.198	.164
	2nd 1/8"	.284	.051	.028
	3rd 1/8"	.092	.015	.020
1/16" Thickness WOODTREAT-TC				
Edge Grain	1st 1/8"	.632	.219	
	2nd 1/8"	.364	.021	
	3rd 1/8"	.196	.021	
Flat Grain	1st 1/8"	.504	.327	.273
	2nd 1/8"	.348	.066	.040
	3rd 1/8"	.320	.036	.040
1/8" Thickness WOODTREAT-TC				
Edge Grain	1st 1/8"	.744	.219	
	2nd 1/8"	.352	.024	
	3rd 1/8"	.342	.009	
Flat Edge	1st 1/8"	.896	.249	.600
	2nd 1/8"	.460	.111	.252
	3rd 1/8"	.316	.057	.092
1/4" Thickness WOODTREAT-TC				
Edge Grain	1st 1/8"	.744	.598	
	2nd 1/8"	.352	.048	
	3rd 1/8"	.288	.036	
Flat Grain	1st 1/8"	1.232	.363	.935
	2nd 1/8"	.860	.117	.184
	3rd 1/8"	.600	.102	.121

*These applications with a standard Penta wood preservative 5% Penta in range or kerosene oil type solvent.

• Comparison With Other Methods of Treating

A comparative study was also made to see how well Woodtreat-TC would distribute in timbers compared to the application of liquids by drilling and injecting the preservatives into the bore-holes by pressure. If comparable results could be obtained, it would mean a great saving in time, labor and equipment to those termite control operators who applied chemicals by drilling, and it would also eliminate one avenue of structural weakening which drilling provides. The comparative tests were made on pine, since Douglas fir is not easily penetrated by any method except where pressure treatment before installation can be utilized. These tests showed:

1. Drilling followed by the application of liquids by pressure indicated the greatest concentration of preservative occurs around the bore-holes, with practically no material reaching the outside portions of the wood except near the ends of the piece where end grain penetration allows the material to exude outward. Woodtreat-TC works in the opposite direction, i. e., from the outside inward, so all exterior portions can be penetrated, and the depth of penetration becomes a function of the amount of Woodtreat-TC applied to the surfaces of the wood.

2. In infested wood, the liquid applications tended to follow the galleries and the rest of the wood got little treatment, whereas, where Woodtreat-TC was used, its distribution depended primarily on diffusion through the wood rather than through the galleries.

3. In 1-inch thick wood, the wood could be completely penetrated with Woodtreat-TC whereas drilling of such wood was impractical. In 2-inch thick stock, complete penetration could be obtained if the location of the wood would permit sufficient application of the Woodtreat-TC.

• Application Techniques

Let us next consider application techniques of interest to termite control operators. Although the original research was carried out using a complete wood coating, it was believed the use of treatment bands at predetermined

(Continued on page 78)

PYRROLE CHEMICAL CORP.

"Progressive Chemicals For Industry"

WE at Pyrrole Chemical Corporation would like to take this opportunity at another fine National Pest Control Association convention to convey our sincere appreciation to all our wonderful PCO friends and customers who have helped to make this the most successful year in our history. Please visit our booth so that we may extend our personal thanks.

WE hope you will look to us as a one-stop complete shopping center for all of your pest control supplies and equipment.

WE know that your stay at this 1956 Convention will be most pleasant and that you will return home having gained some thoughts and wisdom.

DRIVE carefully on your way home and may you have a pleasant and safe trip.

WE look forward to the pleasure of serving you again in the coming year.

OUR pledge to the Pest Control Industry that you may look to Pyrrole Chemical Corporation for the best in PCO chemicals, along with the very latest information on all new products as they become available. Our untiring efforts are always to give you, the customer, the utmost in quality and service at a fair, competitive price.

Sincerely,

PYRROLE CHEMICAL CORP.

Phone ELmwood 3-3960

817 Spring Lane **Portsmouth, Ohio**

PUBLIC HEALTH problems in the pest control industry share the spotlight with business topics at the 23rd National Pest Control Association convention underway at the Sheraton-Cadillac Hotel, Detroit, Michigan, this week.

Under the direction of national convention chairman, Joseph J. Mooney, and the NPCA executive staff, the October 22-25 meeting has brought together outstanding authorities from all over the country to cover these two broad fields and to report on rodent control, audio visual aids, NPCA research projects, fumigation and termite control. On the lighter side, Arthur Wippman and his local convention committee,

Dr. Ralph E. Heal
Executive Secretary

Dr. Philip J. Spear
Technical Director

NATIONAL PEST CONTROL ASSOCIATION

Public Health, Business Topics Highlight 4-Day NPCA Detroit Convention, October 22-25

NATIONAL PEST CONTROL ASSOCIATION

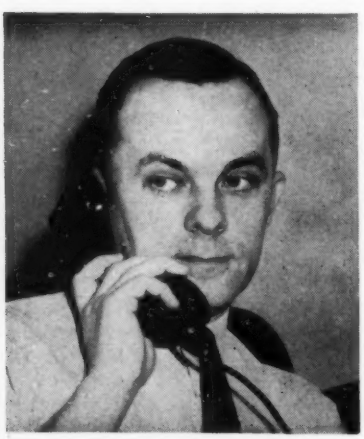
have been burning the candle far into the night planning entertainment for PCOs and their families. A full schedule of activities for the ladies is on tap, too!

The complete, four-day Detroit meeting shapes-up like this:

The 1956 convention is officially called to order Monday morning at 9:00 A.M. with national chairman, Joseph J. Mooney, presiding. After Arthur Wippman extends Detroit's greetings to delegates, H. K. Steckel will lead memorial services. Then, I. B. Carncross delivers the president's message, and Dr. Ralph E. Heal gives the executive secretary's report. A review of accomplishments by committee chairmen and the secretary-treasurer's report conclude the morning program.

After a scheduled luncheon, delegates will reassemble for a full program on business problems, with Dr. Heal presiding. Kicking-off the afternoon session, Harry Canup, head of business administration extension at Oklahoma A. & M. College, Stillwater, wades into the ticklish problem of pricing. Next, Mark Cundiff, manager of the sales training division of Parke-Davis Co., takes up sales and salesmen training.

Tuesday morning's entire program is given over to three talks on public health. Lead off speaker, Dr. Mark Hollis, chief of the division of sanitary engineering services for the U.S. Public Health Service, and an Assistant Surgeon General of the United States, describes public health aspects of pest control. Role of the pest control industry in public health is thoroughly examined when Dr. Henry F. Vaughn, dean of the University of Michigan's



Myron W. Smith
Executive Vice President

I. B. Carncross
President

Harold Schnorrenberg
Secretary-Treasurer

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Diazinon is recommended for cockroach control by Pest Control Operators *only*. Reduce your roach control service costs with GEIGY DIAZINON 25E.

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Diazinon is the most effective and economical residual fly control chemical available. Reports of its outstanding effectiveness have been received from research workers in 39 states.

Diazinon provides excellent control of flies and fly maggots under a variety of conditions. It may be applied in over all residual sprays, in "spot" sprays and in dry and liquid baits.

Whether the existing problem involves maggot control in breeding areas around garbage dumps and trash piles or control of flies around porches, in dairy barns, livestock loafing sheds, calf barns, hog barns or other farm buildings, there is a specific GEIGY DIAZINON product for your particular needs.

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★ NPCA Regional Vice Presidents (Other photographs on page 40)

Charles W. Houghton
Boston, Massachusetts

Jacques J. Hess
New York, New York

Martin T. Meyer
Philadelphia, Pennsylvania

School of Public Health in Ann Arbor, steps to the microphone. Then Dr. R. R. Marsh, Univ. of Illinois, Urbana, takes up cooperation of public health and industry. Dr. Lee C. Truman, PCO from Indianapolis, Ind., rounds off the morning program with an analysis of the pest control industry's contribution to public health.

No business is scheduled for Tuesday afternoon. A tour of Detroit's Greenfield Village and the Henry Ford Museum is planned for PCOs wishing to attend. In the evening, there is an optional night club tour of the famous Elmwood Casino in Windsor, Ontario.

Chaired by NPCA technical director, Dr. Philip J. Spear, the Wednesday program opens with Walter W. Dykstra, assistant to the chief, Branch of Predator and Rodent Control, U. S. Fish and Wildlife Service, Washington, D. C., covering new developments in rodent control. Then, Kent Littig, expert from the Communicable Disease Center's Insect and Rodent Control Training Section, Atlanta, Ga., gives a practical demonstration on the use of audio-visual aids in selling the public health aspects of pest control. Latter part of the morning program will feature a general insect and rodent control session with special attention to resistance problems. Dr. J. McD Grayson, of Virginia Polytechnic Institute, Blacksburg, Va., and William Butts, Ohio State University, Columbus, join forces to report on NPCA research projects. Then, Clifford Lofgren, in charge of household insect research at the U. S. Department of Agriculture's Orlando, Fla., laboratory, takes the floor to discuss the resistance problem. Final feature of the morning program is a panel composed

Full Report On Detroit NPCA Meeting Will Run In the November Issue of PEST CONTROL

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Jackson, Mississippi

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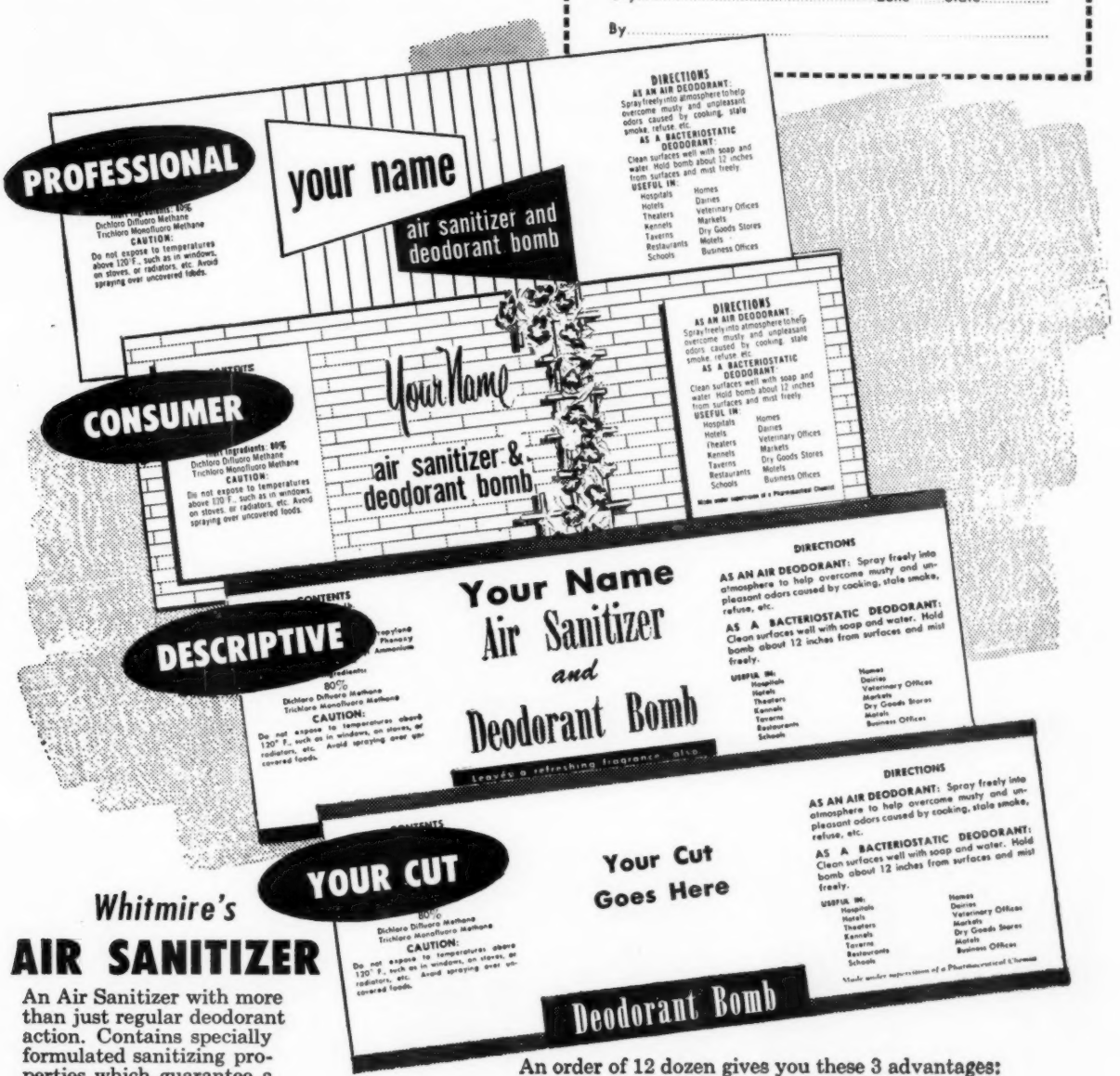

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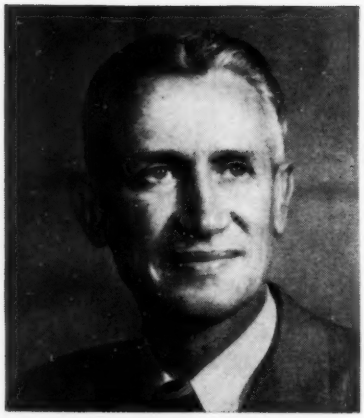


Wayne K. Davis
Berkeley, California

of Mr. Littig, Dr. Grayson, Mr. Butts, Mr. Lofgren, and W. C. MacDuffie, Insects Affecting Man and Animals Section, USDA, Washington, D. C., who will answer specific questions from delegates.

Wednesday afternoon is free with no business scheduled and optional tours have been arranged of an automobile plant and Cranbrook botanical gardens and art gallery.

Wednesday evening delegates will again convene at 8:30 to watch Kent Littig demonstrate some available audio-visual aids, and to hear Dr. Philip J. Spear's explanation of the NPCA's new series of color transparencies.

Termites and fumigation step into the picture Thursday morning, as Myron W. Smith, Hill-Smith Termite Control Co., Memphis, Tenn., and NPCA executive vice president, chairs the A.M. program entirely devoted to these subjects. How fumigants behave is tackled by Randall Latta, USDA stored-product insects section chief, headquartered in Washington, D. C. Dr. John V. Osmun, head of Purdue University's entomology department, unveils latest data on termite research, biology and control. The session is ended by Dr. Ralph E. Heal, who discusses termite pretreatment and BRAB and FHA developments.

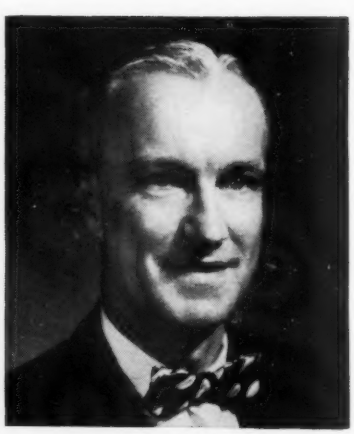
Last day's afternoon session will be entirely devoted to NPCA business, highlight being the election of officers for 1957. The annual banquet is scheduled for 6:30 P.M., with PCO Robert O. Williams, Aard-Vark Pest Control Co., Evansville, Ind., serving as toastmaster.

Although the convention officially comes to a close Thursday evening following the banquet, the board of directors will meet at 9:30 A.M. Friday. At this time the executive board for the coming year is elected.

★ Other NPCA Regional Vice Presidents

Claude Snow
Portland, Oregon

Herman C. Militzer
Toledo, Ohio



C. E. Ryder
Hamilton, Ontario, Canada

Ernest L. Levy
Minneapolis, Minnesota

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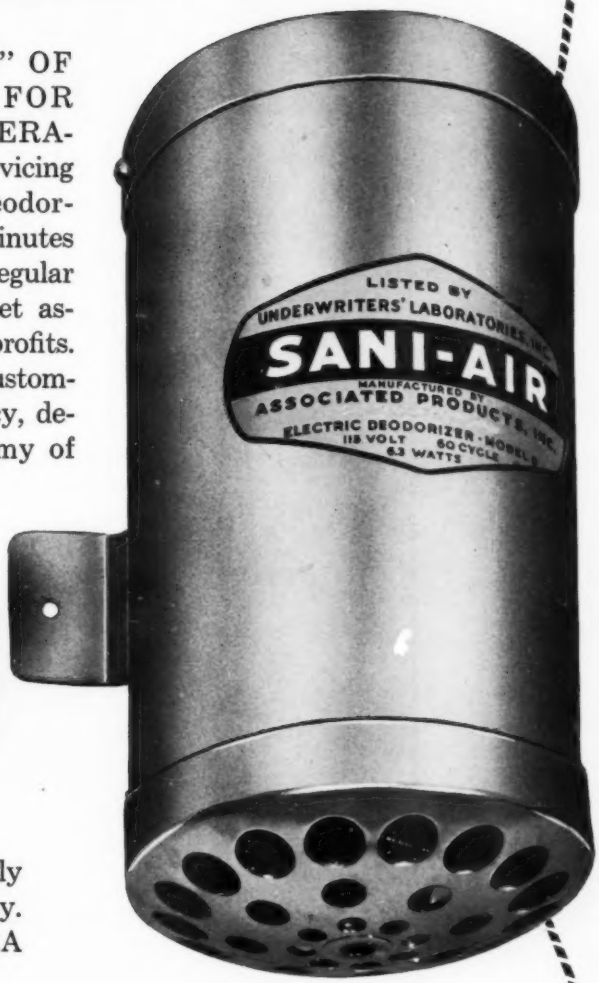

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It's What You Make It

A Guest Editorial
written especially for this issue of Pest Control
by

I. B. Carncross

President, National Pest Control Association

This title applies not only to your life but to the segments of your life; your church, your marriage, your luncheon club, and, of great importance to all of you, your business.

A business that prospers must be progressive, and progress is based on information. The best place to get information is from the biggest reservoir of collective knowledge and experience. In our industry this is the National Pest Control Association.

You might be interested to know how some of our members feel about their membership in the NPCA. A top man in one of our largest member firms has often said, "The NPCA built this establishment." An executive of another large firm says, "I have said that we don't need the NPCA, but I'll have to admit that we would never be where we are today if it were not for the National Pest Control Association."

I don't have to ask the small or medium sized firm how important membership is to them because I know first hand. The service letters, technical releases, and special helps that my firm has received over the years has helped us grow from a very small to a modest, medium sized firm.

If you haven't already guessed it, I'm sold on membership in the National Pest Control Association.

Of course it isn't perfect, because it's made up and run by people. Folks like you and I. But it's still the most valuable focal point of our industry. And the NPCA is what you make it.

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HARLAN R. SHUYLER, Ph.D.
Entomologist, Manager

To Conserve: To Keep Safe

Dr. Harlan R. Shuyler, manager of Conservation Industries, Kansas City, and developer of the famous "Purdue Formula," based on 4 years of rodent bait research.

September 7

Mr. Rudolf Grun
American Chemical Paint Company
Ambler, Pennsylvania

Dear Mr. Grun:

Sorry to have missed you on your recent visit to Kansas City. Let's not let that happen again.

One thing I wanted to talk to you about was the really superior results we've had with Fumarin these past months. Our mouse control has been better than we expected, or experienced with other anti-coagulants -- clean-outs in record time. The rats are really dying, too!

I've long recognized the value of quality baits, both food ingredients and anti-coagulant. We've really got the combination now, thanks to Fumarin. And it's saving us money, too.

Will see you in Detroit ... with some more good reports.

Sincerely yours,

Harlan R. Shuyler

HRS:mel

Harlan R. Shuyler,

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TERMITE & PEST CONTROL MANUFACTURERS ASSOCIATION

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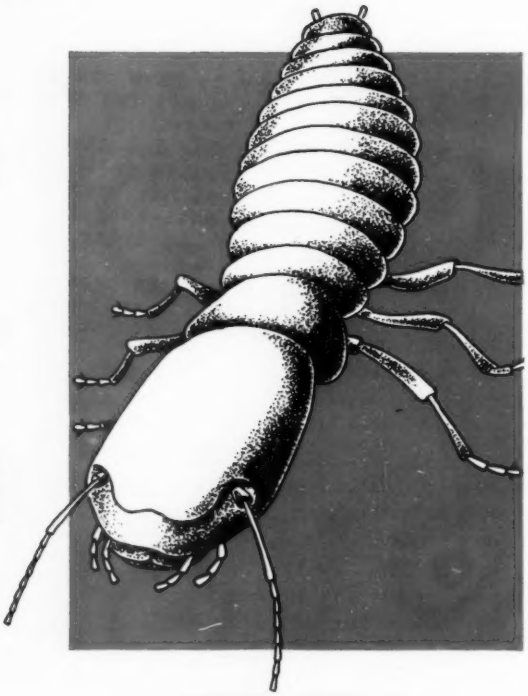

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PROGRAM

for the 1956 annual NPCA convention

SUNDAY, OCTOBER 21, 1956
English Room

1:30 P.M. Directors Meeting
Grand Ballroom Lobby

2:00 - 5:00 P.M. Registration
Crystal Ballroom

3:00 - 5:00 P.M. Reception and Tea

•

MONDAY A.M. OCTOBER 22, 1956
Grand Ballroom Lobby

8:00 A.M. - 5:00 P.M. Registration
Grand Ballroom

Joseph J. Mooney, Presiding

9:00 A.M. Convention called to order
Joseph J. Mooney

National Anthem,
William Ives, soloist
Mrs. Joseph J. Mooney, accompanist

Invocation — Dr. Marshall Reed

Greetings — Arthur Wippman

Memorial Service — H. K. Steckel

Annual Message of the President
I. B. Carncross

Report of the Executive Secretary
Dr. Ralph E. Heal

Business Meeting

(a) Report of Secretary-Treasurer
Harold Schnorrenberg

(b) Report of Public Relations Committee

(d) Report of Finance Committee

(e) Report of State and National Integration Committee

Crystal Ballroom

12:00 A.M. Noon Luncheon

•

MONDAY AFTERNOON
Grand Ballroom
Dr. Ralph E. Heal, Presiding

2:00 P.M. Your Price Is Too High
Harry Canup

3:15 P.M. Sales and Salesmen Training
Mark Cundiff

4:00 P.M. Costs Committee Program

•

MONDAY EVENING
Grand Ballroom

8:00 P.M. Mixer

TUESDAY A.M. OCTOBER 23, 1956
Grand Ballroom
Dr. Mark Hollis, Presiding

9:00 A.M. Role of Pest Control Industry in Public Health
Dr. Henry F. Vaughn

10:00 A.M. Cooperation of Public Health and Industry
Dr. R. R. Marsh

11:00 A.M. Our Industry's Contribution To Public Health
Dr. Lee C. Truman

•

TUESDAY AFTERNOON

1:00 P.M. Tour of Greenfield Village And Henry Ford Museum

•

TUESDAY EVENING

6:30 P.M. Optional night club trip, dinner, dancing and entertainment. Elmwood Gardens, Windsor, Ontario.

•

WEDNESDAY A.M. OCT. 24, 1956
Grand Ballroom
Dr. Philip J. Spear, Presiding

9:00 A.M. New Developments in Rodent Control
Walter W. Dykstra

9:20 A.M. Audio-Visual Aids in Promoting Public Health Aspects of Pest Control
Kent Littig

10:00 A.M. General Insect Control Session With Special Attention To Resistance Problems

(a) NPCA Research Projects
Dr. J. McD Grayson
William Butts

(b) Resistance Problems
Clifford Lofgren

(c) Panel Discussion
Kent Littig, Dr. J. McD Grayson, William Butts, Dr. P. J. Spear, W. C. MacDuffie.

WEDNESDAY AFTERNOON

1:00 P.M. Tours of an Auto Plant and Cranbrook.

•

WEDNESDAY EVENING
Harold Schnorrenberg, Presiding

8:30 P.M. Demonstration of Audio-Visual Aids — Kent Littig
NPCA Color Transparencies New Series — Dr. Philip Spear

•

THURSDAY A.M. OCT. 25, 1956
Grand Ballroom
Myron W. Smith, Presiding

9:00 A.M. How Fumigants Behave
Randall Latta

10:00 A.M. Termite Research, Biology and Control
Dr. John V. Osmun

11:00 A.M. Termite Pretreatment and BRAB and FHA Developments
Dr. Ralph E. Heal

•

THURSDAY AFTERNOON
Grand Ballroom
Harold Schnorrenberg, Presiding

2:00 P.M. Regional Reports of Vice Presidents

3:00 P.M. Discussion of Association Matters

3:30 P.M. Business Meeting
Election of Officers

•

THURSDAY EVENING
Robert O. Williams, Toastmaster

6:30 P.M. Annual Banquet Entertainment

•

FRIDAY A.M. OCTOBER 26, 1956

9:30 A.M. Board of Directors Meeting

10:00 A.M. Election of Executive Board

October 21-25, Sheraton-Cadillac Hotel, Detroit, Michigan

NATIONAL PEST CONTROL ASSOCIATION

UCLA Entomologists Evaluate Research Data On Dry-Wood, Subterranean Termite Control

by

DR. WALTER EBELING and ROY J. PENCE

Department of Entomology, University of California, Los Angeles

A formal Agricultural Experiment Station Project on structural and household insects was initiated at the University of California, Los Angeles, on July 1, 1955. Previous to that date, research in this field of entomology on the Los Angeles campus, as far as the writers are concerned, was confined to miscellaneous investigations. Among other things, this resulted in a reasonably complete photographic record of the structural and household insects of the United States. Copies of color transparencies of these insects have been made available to PCOs through the National Pest Control Association. Easily constructed termitaria for study or display of dry-wood or dampwood termites were designed (Pence, 1955). Also a Microsonic Detector, a portable listening instrument that greatly amplifies sounds made by wood-destroying insects, was developed during this period (Pence, 1954).

In the field of electronic radiations some promising results were obtained with infrared for control of beetles in floors, and this work is being continued. All stages of **Lyctus** beetles in ½ inch hardwood flooring were killed at 7 minutes exposure to a battery of six lamps covering an area of 342 sq. in. Two prototypes of equipment considered suitable for field work are being tested by PCOs. This equipment may be particularly suitable for the "spot treatment" of a number of species of wood-destroying insects. Likewise, research pertaining to the use of radio frequency heating is of current interest in view of impending developments in industrial equipment that might be adapted or modified for pest control work.

From a talk delivered before the thirteenth annual convention of the Pest Control Operators of California, Inc., Sacramento.

● Research on Soil Treatments

Among the research projects begun at UCLA since July, 1955 is one on soil treatments. The initial phase of this work involved the determination of the toxicity to the western subterranean termite, **Reticulitermes hesperus**, of a number of representative insecticides in (a) topical application, that is, applied directly to the bodies of the insects, (b) as residues on glass, and (c) in treated soil. All insecticides were applied as emulsions, aqueous solutions, or kerosene solutions.

In the topical and residue applications the insecticides were applied by means of a settling tower. In the topical applications, insecticide mists were allowed to fall on the termites in vials that were a half-inch in inner diameter and 2-5/16 inches long. In the residue experiments mists were allowed to fall into empty vials, in which the termites were placed after the residues had dried. Dental cotton rolls, cut in two and dampened, were attached to the corks with which the vials were stoppered and provided adequate moisture.

For the soil treatment tests the insecticides were applied at the rate of 2 gallons of a 1% concentration of toxicant to 10 sq. ft. of soil. The soil was contained in 4 oz. jelly jars. One month after treatment, samples of soil were removed by means of cork borers and placed in vials and dampened. Worker termites were placed in these vials and they were then stoppered.

In all treatments, three lots of 10 termites were used for each insecticide. The period for 50% kill (MLP) was determined, based on the period required for cessation of activity of the appendages.

The results of the experiments are shown in Table 1. Figures presented in the table are the average MLP's for the three lots of termites. In the experiments with topical applications the insecticides ranged in decreasing order of toxicity as follows: pentachlorophenol> sodium arsenite> lindane = dieldrin> DDT > chlordane. For the residues in the glass vials, the insecticides ranged in their effectiveness as follows: pentachlorophenol> Sodium arsenite> malathion> lindane = DDT> toxaphene = dieldrin> chlordane.

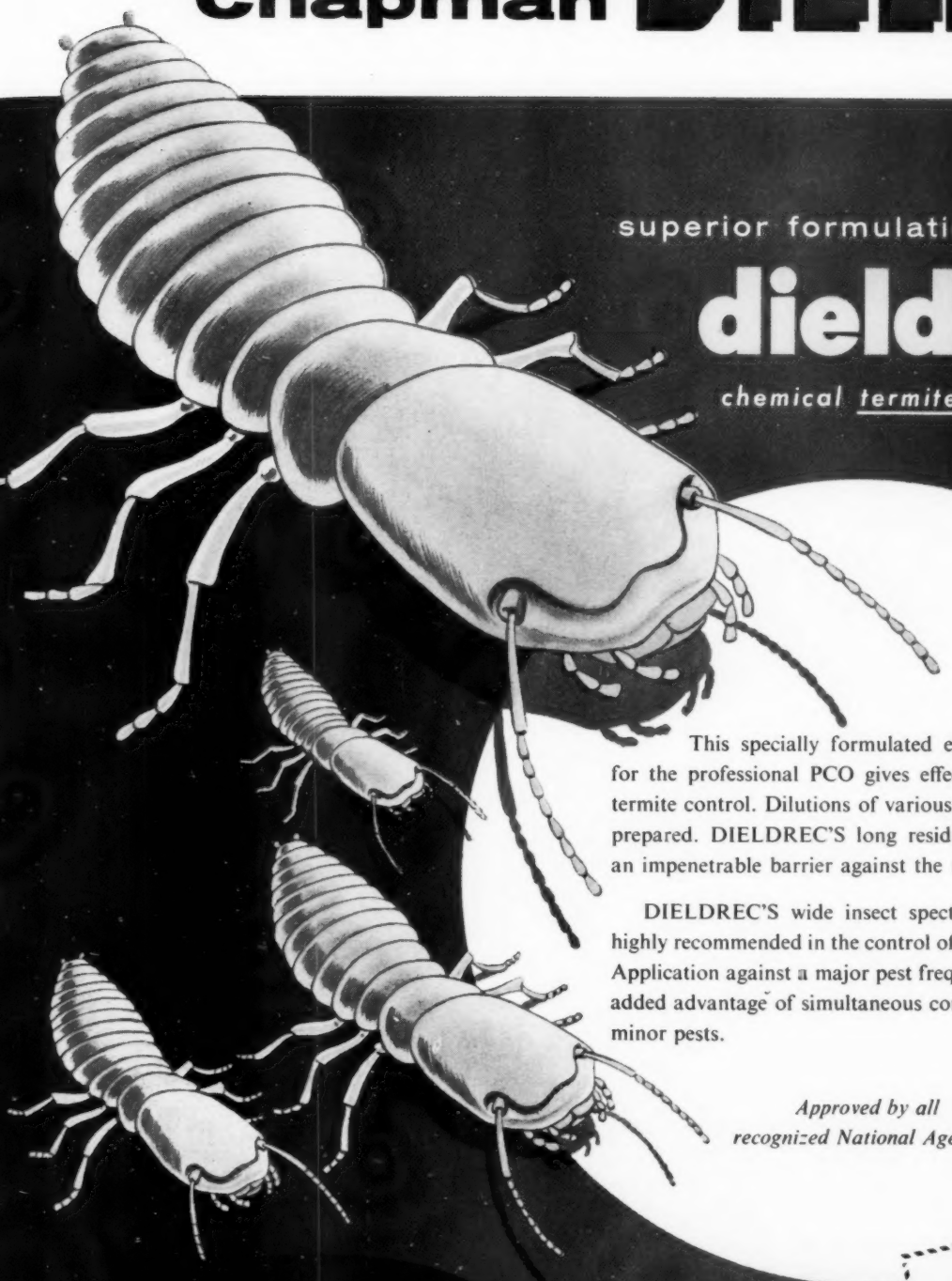
The decreasing order of effectiveness of the insecticides used in the soil treatments, one month after treatment, was as follows:

TABLE 1
Period (hours) required to kill 50% of subterranean termites with (a) topical applications, (b) residues, and (c) treated soil.[1]

Insecticide	Medium Lethal Period (Hours)			
	Topical	Residue	Treated soil after 1 month	Treated soil after 6 months
Pentachlorophenol[2]	0.5	0.3	<4	1.8
Sodium pentachlorophenate[3]	....	....	<4	3.1
Sodium arsenite[3]	1	0.6	<4	...
Lindane	11	17	9	...
Dieldrin	24	32	21	...
DDT	14	20	12	23
DDT[2]	...	18	11	21
Chlordane	28	39	23	41
Chlordane[2]	....	24	14	27
Malathion	....	2	<4	...
Toxaphene	21	30	15	..
Parathion	..	...	4	..
Diazinon	10	....	9	...
Heptachlor	22	..	24	...
Kerosene	...	67	20	28
Water	84	77	42	68

1. Treatments were made on October 15 and 16, 1955. Termites were placed on the treated soil one and six months later. The insecticides were applied in the form of a dilute emulsion except where otherwise indicated. The concentration of toxicant was 1% and the diluted emulsions were applied at the rate of 2 gallons to 10 sq. ft. of soil in the soil treatments.
2. In kerosene solution.
3. In aqueous solution.

Chapman DIELDREC



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DIELDREC'S wide insect spectrum also makes it highly recommended in the control of public health pests. Application against a major pest frequently produces the added advantage of simultaneous control of many other minor pests.

Approved by all recognized National Agencies

CHAPMAN

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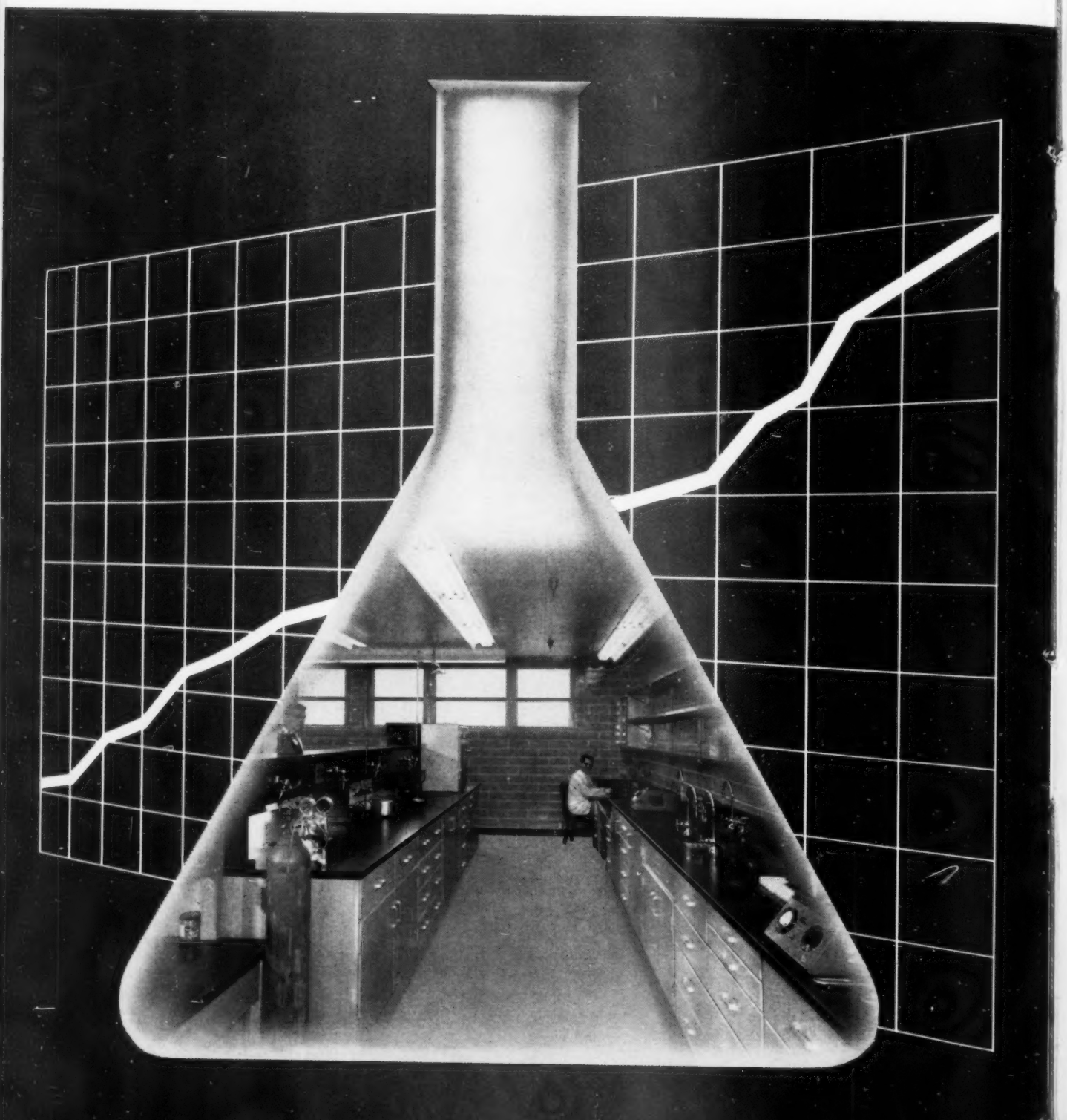

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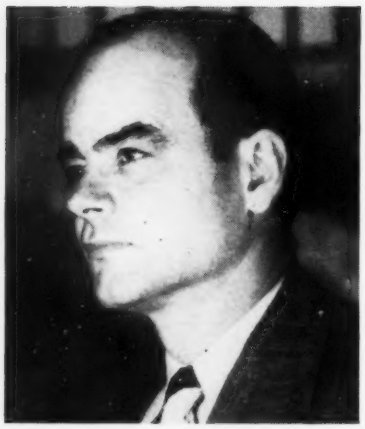


Dr. Walter Ebeling

pentachlorophenol, sodium pentachlorophenate, sodium arsenite and malathion (MLP less than 4 hours)> parathion> lindane= diazinon> DDT> toxaphene> dieldrin = chlordane = heptachlor. Six months after treatment the relative toxicity of pentachlorophenol, sodium pentachlorophenate, DDT and chlordane was found to be about the same as in tests made one month after treatment. There were not enough termites available for tests with other insecticides. The higher MLP's six months after treatment may be accounted for by the more favorable moisture and/or temperature conditions in which the termites were maintained, for the period of survival was much greater in the check vials. This ratio of the relative effectiveness of the soil treatments was later confirmed in a general way by data obtained by Robert B. Newland in a student research project at UCLA. Mr. Newland worked independently of the writers and was unaware of their results, but used the same experimental techniques. The results of his experiments are shown in Table 2.

Within the limits of variation that may be expected between two experiments, the data presented in Table 2 are in good agreement with those pertaining to soil treatments in Table 1. With the emulsions, DDT, lindane, and toxaphene are again distinctly superior to chlordane, heptachlor, and dieldrin and the latter are again approximately equal in effectiveness.

As in Table 1, there was no significant difference in the results whether DDT was in a water emulsion or dissolved in kerosene. This has been substantiated by several other tests besides those reported in this paper. On the other hand, in both tables the data show chlordane to be much more effective in kerosene solution than in water emulsion. Table 2 shows in addition that the effectiveness of still other chlorinated hydrocarbons is greatly increased by using kerosene as the diluent. For the chlorinated hydrocarbons other than DDT, the average MLP for the insecticides in kerosene was only 56% as great as in water emulsions. However, it is of practical importance to know that DDT is an exception to the rule, for the soil treatment is much more expensive if the toxicant is applied to the soil in a petroleum carrier than if it is applied in a water emulsion. In the treatment of soil over which a slab foundation is to be laid, a petroleum base is undesirable because it has the tendency to penetrate through cement.

Over a period of years kerosene can be expected to leave the soil by evaporation. Some of the toxicants may remain active and it is possible that their effectiveness in relation to kerosene alone may become greater. However, at present it may be assumed that the apparent superiority of toxicants dissolved in kerosene to those dissolved in or emulsified with water is to be accounted for by the fact that kerosene alone has considerable toxicity to termites.

DDT formulation used in preparation of the emulsions applied in this series of experiments was a proprietary 25% DDT emulsifiable concentrate. The solvent in this concentrate exhibited a relatively low rate of volatility and it was believed that this might account for the fact that there was no difference in the toxicity of the soil treatment with DDT emulsion as compared to the

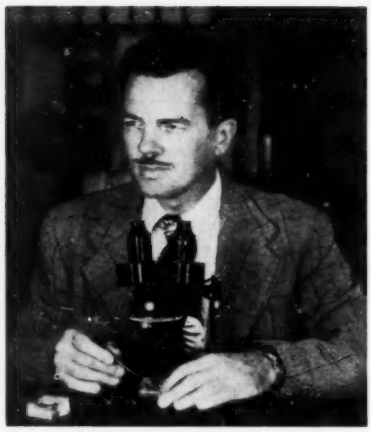
TABLE 2

Period (hours) required to kill 50% of subterranean termites exposed to soil treated with various insecticides as emulsions and as kerosene solutions[1]

	Medium Lethal Period (Hours)*			
	Water Emulsions		Kerosene Solutions	
Insecticide	3-14	3-21	3-14	3-21
DDT	15	17	18	18
Chlordane	32	32	15	10
Heptachlor	28	30	17	16
Dieldrin	30	31	18	15
Aldrin	32	31	12	14
Lindane	19	15	10	12
Toxaphene	..	24		12
Check	49	..	30	..

*Significant difference at odds of 19:1; 3.6.

1. Soils were treated on February 22, 1956 and termites were placed on treated soil on March 14 and March 21, 1956. The insecticides were applied at a concentration of 1% of toxicant.



Roy J. Pence

kerosene solution. Therefore another brand of 25% DDT emulsifiable concentrate was used in which Xylene, which proved to be much more volatile, was the solvent. No difference was found in comparative tests between the two brands in soil treatments.

Lindane paralyzes termites much more quickly than the other chlorinated hydrocarbons, but they spend a relatively longer percentage of time in a moribund condition. Although pentachlorophenol and DDT were found to be much more toxic than chlordane in the experiments summarized in Tables 1 and 2, they were found to be inferior to chlordane five years after treatment on the basis of soil treatment experiments made by the U. S. Forest Service, using the eastern subterranean termite, **Reticulitermes flavipes**, as the test insect. Likewise Hetrick (1952) also found chlordane to be more toxic than DDT as a soil treatment when tested against the eastern subterranean termite both one year and five years after treatment. Future tests with the present series of treated soils will determine the relative susceptibility of the western subterranean termite to the various insecticides for periods up to five years.

● Influence of Insecticide Vapors in the Soil

The data in Tables 1 and 2 should be construed to mean only that the western subterranean termite differs greatly from the eastern subterranean termite with respect to its relative susceptibility to the various insecticides. They do not necessarily indicate the relative effectiveness of the insecticides under the conditions of practical use. One of the questions left unanswered by the soil

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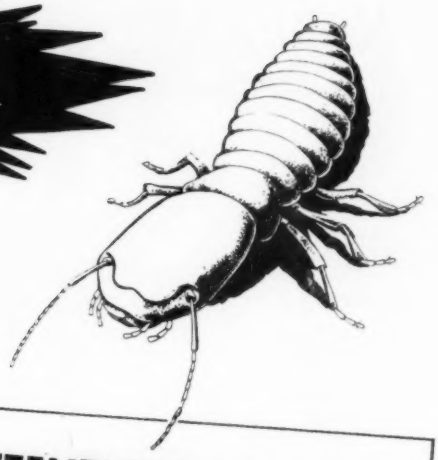

BRAB* rates of application

1. Slab-on-Ground

(a) Apply 1 gallon per 10 square feet as an over all treatment under the slab and under attached porches. Overall treatments applied to washed and ungraded gravel fills or fills of an absorbent material; i.e., cinders, should be increased by ½ gallon per 10 square feet.

(b) Apply 2 gallons per 5 lineal feet to critical areas under the slab, such as along the inside of foundation walls and around utility entrances and interior partition foundation walls.

(c) Apply 2 gallons per 5 lineal feet along the outside of foundations.

2. Crawl-Space Houses

(a) Apply 2 gallons per 5 lineal feet to critical areas under the house, such as along the inside of foundation walls, and around piers and utility entrances. Do not make an overall treatment in the area.

(b) Along the outside of foundation walls, including the part opposite entrance platforms, porches, etc., apply 2 gallons per 5 lineal feet where the foundation is shallow and 4 gallons per 5 lineal feet where the foundation is deep.

(c) Apply 1 gallon per 10 square feet of soil surface as an overall treatment only where the attached porches, entrance platforms, utility entrances, etc., have covering slabs or fill or ground.

3. Basement Houses

Application to be the same as for crawl-space houses.

4. Voids of Unit Masonry Walls

All voids of unit masonry walls and piers to be treated with an application of 1 gallon per 5 lineal feet applied from grade to footing.

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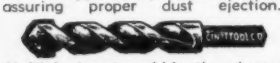

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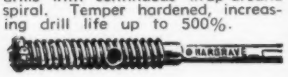

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TABLE 3

Period required to kill 50% of dry-wood termites placed on blocks of wood treated with insecticides in three types of treatment[1]

Insecticide	Median Lethal Period (Hours)*			
	Dust			
	No Fan	With Fan	Mist	Vapor
DDT	30	15	42	32
Chlordane	18	8	60	61[2]
Lindane	16	..	27	21
Dieldrin	28	..	54	33
Toxaphene	77	..	>100	85
Pentachlorophenol	40	..	>100	12
Sodium fluosilicate	29	13	..	..
Cryolite (5%)	..	9	..	..
Cryolite (10%)	..	6	..	..
Aroclor 1248 (30 g.-100)	..	..	..	52
*Significant difference at odds of 19:1	11.7	3.1	8.6	9.2

1. The treatments were applied on February 2, 1956. With all these types of treatment the amount of toxicant introduced into the room was 5 grams to 100 cu. ft. of space except for the second cryolite dust, which was applied at the rate of 10 grams to 100 cu. ft. of space and **Aroclor 1248**, which was applied at 30 grams to 100 cu. ft.
2. Chlordane did not vaporize completely; much charred material remained in the heated skillet.

contact experiments is the possibility of the insecticides extending their effect farther than the limits of the poisoned soil by means of their vapors.

In a preliminary test with four insecticides, workers of the dry-wood termite, **Kalotermes minor**, of uniform sizes were used as the test insects because it was known that the untreated checks could be maintained indefinitely without mortality. A two-inch column of Yolo clay soil poisoned 24 hours previously was packed into the bottom of a 4" x 3/4" glass vial, followed by 1 inch of unpoisoned soil. The latter had the normal moisture of Yolo clay soil suitable for the growing of plants. A few disks of paper towelling were pressed against the untreated soil and 20 termites were placed on these disks, followed by other bits of paper towelling. A piece of Kleenex tissue was placed against the open mouth of the tube and the tube was either (1) placed vertically against moist soil, or (2) horizontally against a bank of loose dry soil. In the latter case a pile of soil was placed over the half of the tube with the open end. The dry soil allowed for a relatively free passage of vapors through the 1 inch cell in which termites were contained. When the tube was placed against damp, packed soil, however, vapors could become concentrated in the area occupied by termites.

These experiments were made in a greenhouse room in which temperatures varied from 60° to 78°F. and the relative humidity varied from 60 to 100%.

In the experiments in which the open end of the tube was occluded by moist, packed soil the number of termites (out of 20) that had died after 7 days of exposure to vapors of the four insecticides was as follows: dieldrin, 20; sodium pentachlorophenate, 18; chlordane, 16; and DDT, 16. In the experiment in which the tube's open end was occluded by loose, dry soil, the number of termites that had died after 8 days was as follows: dieldrin, 20; sodium pentachlorophenate, 6; chlordane, 6; and DDT, 4.

The relatively high degree of effectiveness of dieldrin vapors is curious in view of the low vapor pressure of this compound, that is, 1.8×10^{-7} mm Hg, about the same as that of DDT, as compared to 1×10^{-5} mm Hg for chlordane. However in a confined space the rate of volatility of an insecticide may be a relatively minor factor as compared to toxicity.

An interesting observation relating to the above test is that chlordane was more toxic to dry-wood termites than was dieldrin when used as a dust and under conditions in which termites made contact with the insecticide residue (see Table 3). It is apparent the relative toxicity of the various insecticide vapors may not necessarily be in the same ratio as that of the solid residues. It would appear a relatively low rate of volatility for compounds having highly toxic vapors might prove to be increasingly advantageous as the period between date of treatment and date of observation increases.

The above experiment was repeated with subterranean termites kept on damp wood chips. From the treated soil, the vapors were allowed to penetrate through 1 inch of dry soil or 1 inch of damp soil, to the cell of termites on wood chips, and thence to dry soil. The vapors passed through damp soil more slowly than through dry soil. The periods (hrs.) required for 50% kill for insecticides as 5% di-

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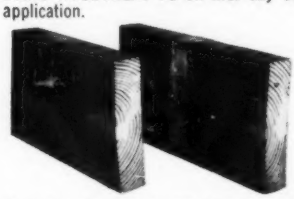
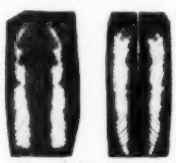


Four days later. Note diffusion of Penta and oil from point of application to end of plank. Dried crust is almost ready to flake off or be brushed off.



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lute emulsions (except for pentachlorophenol, which was dissolved in No. 2 Fuel Oil) were as follows:

A. When vapors passed through dry soil: lindane, 3.2; dieldrin, 4.0; DDT, 23; chlordane and pentachlorophenol, 24; toxaphene, 25; sodium pentachlorophenate, 29; water alone, 52; and fuel oil alone, 51.

B. When vapors passed through damp soil: dieldrin, 14; lindane, 21; pentachlorophenol, 26; sodium pentacholorophenate, 33; chlordane, 40; DDT and toxaphene, 42; water alone, 54; and fuel oil alone, 55.

There is an urgent need for a laboratory method that will enable us to determine the relative effectiveness of treated soils under conditions comparable to those obtained in the field. A technique should be developed in which termites would be allowed to burrow their way through treated soil to wood, for the relative toxicity of the various treated soils might not necessarily indicate their relative deterrent effect as barriers to termites.

In addition, insecticides the laboratory experiments indicate are most promising should be compared in field trials in controlled tests and in sufficient number to provide for statistical analysis. In the extensive subdivisions for the construction of new dwellings in California, ample opportunity exists for such an experiment in soils formerly planted to fruit trees and in which subterranean termites now exist. Plans are now being made for extensive tests of this type.

● Slab-on-Ground Foundation Treatment

In connection with soil treatment experiments, in June, 1955, 1820 sq. ft. of area to be covered with a cement slab foundation was treated with a 1% chlordane solution at 10 gallons per 100 sq. ft. The soil was a typical Yolo clay loam. Annual tests of the toxicity of the treated soil are to be made. In addition, migration of moisture under the slab, from the irrigated soil on the slab's periphery, as well as the soil temperatures, will be determined by means of tensiometers, thermisters, and soil thermographs[1]. The relation of the migration of moisture under slab to termite and industrial decay control will be determined.

● Experiments With Methyl Bromide

Experiments were made on the fumigation of soil for subterranean termites by liberating methyl bromide gas under a polyethylene tarp[2]. The purpose of the experiment was to evaluate potentialities of such a treatment for pre-construction control of subterranean termites in areas in which they are known to exist in the soil where a dwelling is to be constructed. The possible use of methyl bromide applied through holes drilled in cement slab foundations will also be investigated. An experimental slab will be constructed to facilitate this phase of the investigation.

Although soil fumigants have been used for the control of subterranean termites, they have been applied in kerosene solutions. These are effective if applied over or reasonably near to a termite colony, but since the solution is released at a single point, the gas proceeds down-

1. This phase of the termite investigation at UCLA was expedited by means of a grant from the Velsicol Corporation, Chicago, Ill.
2. This phase of the termite investigations at UCLA is being conducted in cooperation with Norman Ehmann, entomologist for Neil A. Maclean Company, Los Angeles.

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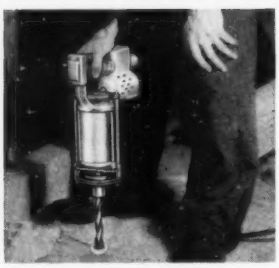

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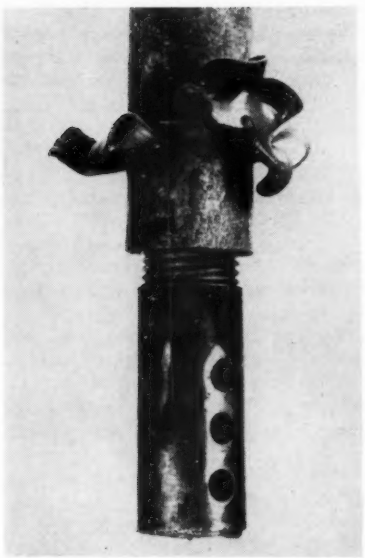

Fig. 1. Cage at end of 1" pipe used by UCLA scientists to lower subterranean termites into ground. Notice modeling clay being forced out of chamber near pipe threads. This seals ground hole when pipe has been inserted.

ward into the ground in a spreading cone-shaped pattern. It does not spread very far laterally near the surface. On the other hand, a gas liberated under a tarp will penetrate downward into the soil over the entire area covered by the tarp.

In the present experiment the edges of the tarp were buried in a trench dug around the treated area. Gas was liberated by placing a 1 pound can of liquid methyl bromide in warm water and conducting the gas under the tarp by means of a "gopher gun."

A method was devised of lowering cages containing termites into the ground to depths of as much as four feet in holes made by means of a soil tube. A cage made from brass tubing, perforated with holes, and fitted along its inner surface with a 40-mesh screen, is threaded so that it can be screwed into the end of a 1 inch pipe (Figure 1). Just above the threads at the end of the pipe is a chamber containing modeling clay. By means of a wrench extending down through the pipe from its free end, a threaded plug is forced downward against the clay in the chamber and the clay is forced out of narrow slits in the pipe, as shown in Figure 1. The clay tightly plugs the hole into which the pipe has been inserted, forming a tight seal.

Worker termites are placed in the cage after it has been filled with wood chips, and the cage is lowered into a hole in the ground and sealed in as described here. Sieved soil is poured into the space in the hole surrounding the pipe and above the clay seal and is then tamped down.

Besides termites, saw-toothed grain beetles have been used, having been placed in the brass cages filled with rolled oats. These beetles are very sensitive to methyl bromide and they may be used to determine the depth to which gas has penetrated. An advantage in the use of beetles is that they can be kept alive in cages longer than the termites.

With both termites and beetles, it has been found that complete mortality can be obtained at depths of at least 4 feet with methyl bromide gas applied at the rate of 1 pound to 50 sq. ft. of Yolo clay soil. In untreated checks there has been little or no mortality during the 4 to 10 day exposure periods.

A possible use for methyl bromide for soil fumigation under "crawl space" was indicated by one experiment. A subterranean termite infestation was found to have its origin along the inside

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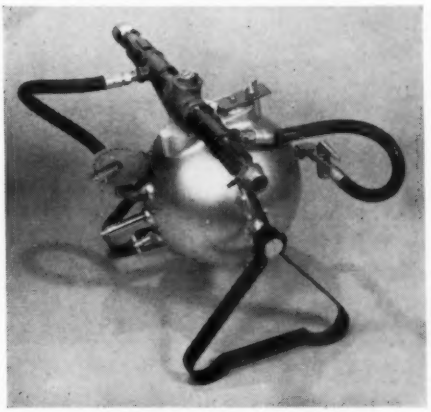

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of a foundation and under partially earth-filled cement steps. A polyethylene tarp a yard wide and 15 feet long was attached to the top of a mud sill by nailing a series of laths over its edge and onto the sill. The other edge of the tarp was covered with soil to form a lean-to tent along 15 feet of the foundation. Two pounds of methyl bromide gas was released under the "tent." A hole was made into the upper portion of the space enclosed by the steps and one pound of methyl bromide was released into this enclosure. Rags were stuffed into spaces on the back sides of the steps under the house, from which gas could escape.

After the fumigation, warning sounds of worker termites in response to tapping, at first very conspicuous, gradually declined in number until in about 10 days they could no longer be heard. It was assumed that the termite colonies were exterminated by means of the methyl bromide fumigation. Then a soil treatment was applied to the areas involved in order to insure against reinfestation at some future date.

The writers do not necessarily mean to imply that methyl bromide fumigation would be practical or desired for "crawl space" treatment. Since a treatment with residual effectiveness is required by law, the fumigation might entail too much additional expense. Also the hazards to the operator would have to be carefully evaluated.

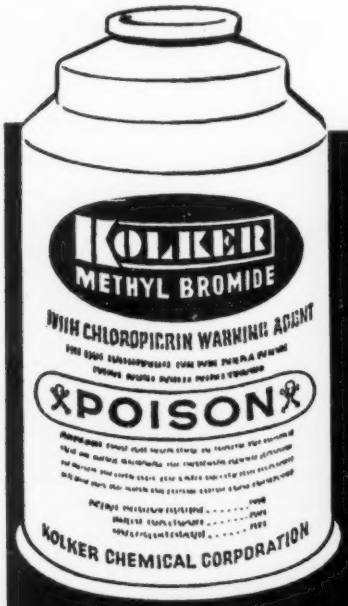
● Effect of Insecticide Residues On Dry-Wood Termites

It is generally conceded that insecticide residues applied to the interior surfaces of an attic would be desirable if they would remain effective against dry-wood termites (**Kalotermes** spp.) sufficiently long to be of practical value in control. The insecticides might be applied in newly constructed dwellings, or after a methyl bromide fumigation, to prevent infestation. An attic treatment might be a useful feature of a guaranteed long-term termite service.

Dry-wood termites (**Kalotermes minor**) were obtained from infested dead walnut trees and placed between layers of paper towelling in covered petri dishes along with a small amount of water. By means of an aspirator, worker termites were taken from the petri dishes when needed for experiments to be described below.

Pieces of Douglas fir wood were cut into dimensions of 2½ inches in length, 1-7/8 inches in width, and 3/4 inch in thickness. On each side of these blocks a groove was made 1/8 inch wide and 1/4 inch deep. A hook screw was screwed into one end of each block. By means of these hooks the blocks were suspended in a room of 250 cu. ft. capacity constructed for the purposes of the experiment. Six blocks were suspended on one side wall, six on the back wall, and six from the ceiling. On the walls the blocks were suspended in such a way that only one edge touched the wall. Insecticides were introduced into the shack through a 2 inch hole in the door that could be stoppered with a cork after each treatment. These were applied in the form of a dust, a mist, and a vapor, except for the inorganic insecticides, which were used only as dusts.

In whatever formulation used the insecticides were applied at the rate of 5 grams of actual toxicant to 100 cubic feet of space, except in one of the cryolite treatments. In this treatment, the dust concentration was increased from the usual 5% to 10% of the toxicant, and Aroclor



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1248, a chlorinated biphenyl resin, was used at 30 grams to 100 cu. ft.

The mists were of a 1% concentration of toxicant in aqueous emulsions, except for pentachlorophenol, which was in a kerosene solution. The vapors were formed by dropping the technical compound into a skillet heated on an electric heater. With some of the dust treatments an electric fan was placed in the room to circulate air. A fan was also used with all mists and vapors. Sprays were considered to be impractical because it was believed that water from the "run off" would result in damage to the ceiling under an attic.

The wood blocks were allowed to remain in the treated room for one hour, after which the insecticide still floating about was blown out, and the residue on the walls and ceiling removed by means of a vacuum cleaner. The floor was covered with a polyethylene tarp and insecticide falling to the bottom could be removed with this tarp.

Three of the treated blocks from each treatment were placed in 100 ml beakers and 10 worker termites were placed on each block.

The termites did much crawling about at first on all blocks but eventually they congregated in the narrow slits cut into the wood, particularly on the side of the block away from the source of light. On the untreated check block they started feeding on and burrowing into the wood as soon as they came in contact with it, soon causing piles of frass to form at the bottoms of the slits in which they were feeding. On the treated blocks the termites never fed on the wood to any discernible extent. Even with materials such as toxaphene and Aroclor 1248, which would allow some of the termites to survive for a week or 10 days, they would do no feeding. When some of the treated blocks were placed on a substrate of gypsum, the termites would gouge out large holes in this material, but would not feed on the treated wood. As soon as winged forms can be reared, they will be tested to determine whether they also will refuse to feed on insecticide-treated wood.

The MLP's of termites placed on treated blocks of wood are shown in Table 3. Dusts proved to be most effective of the three formulations. Their effectiveness could have been increased by circulating air in the room in which treatments were made. This was shown by repeating treatments with some of the insecticides and placing an electric fan in the room to circulate air. The average MLP was decreased 53%. The greater velocity of the dust particles results in greater impingement on surfaces against which they are directed.

Mists, applied by means of an electric sprayer, were not as effective as dusts. Evidently they did not result in as great a deposit of insecticide, even though a fan was used. Presumably many of the larger droplets settled to the floor before they could be carried about by air currents for a sufficient period to insure an adequate degree of insecticide deposition.

As previously stated, a fan was also used when the vapors were introduced into the room. With lindane, a second test was made with no fan and the MLP was increased from 21 to 31, indicating that moderate air circulation

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will increase the average deposit of an insecticide vapor about 50%. Pentachlorophenol was more effective as a vapor than in either of the other formulations. The average MLP of the rest of the insecticides that vaporized completely was only 22% greater than that of dusts (without a fan). This was rather unexpected, because residues of vapors are ordinarily considered to be of negligible consequence. It is evident, however, that if the insecticidal vapors are kept circulating about in a room for a sufficient period, in this case one hour, the amount of insecticide deposited on the inner walls of such a room can be of practical value in insect control. The ease of application of vapors, the uniformity of their distribution over all inner surfaces of a closed structure, and absence of the conspicuous residues resulting from the large proportion of diluent usually required for the application of dusts, are factors favoring the use of vapors. On the other hand, the present series of tests may eventually indicate that the absence of decomposition of the inorganic insecticides might favor their use, even as dusts. Most dusts could probably be used at much higher concentration of toxicant than that which was emloyed in the present tests.

The high degree of effectiveness of cryolite was a particularly encouraging result of the experiment, in view of its low mammalian toxicity coupled with the fact that it cannot be absorbed through the skin (the termites ingest it in the process of grooming one another).

Treated blocks of wood are being kept in an attic so they can be evaluated under field conditions. They will be taken from the attic at yearly intervals and tested for residual toxicity, in the manner previously described, until the residues are no longer effective.

An experiment was made in which a lindane vapor was released in the attic of a dwelling of 1693 sq. ft. of floor space. The roof of this dwelling was about 60% flat and 40% gabled. Volume of the attic was calculated to be about 4200 cu. ft. At the rate of 5 grams of toxicant to 100 cu. ft. of space, the concentration employed in previous experiments, 210 grams of lindane was vaporized in the attic treatment. Before the vapor was released, four sets of three wood blocks were placed in various parts of the attic, ranging from near the point of vapor release to the most remote areas of the flat and gabled portions of the attic. In all cases blocks were suspended in the highest locations in the areas in which they were placed, and this presumably resulted in their being in the locations of the minimum deposit of insecticide.

A Pestron Unit was used to vaporize the lindane. This machine was placed a few feet from the "crawl hole." Lindane was used not because it was necessarily the most promising of the insecticides that could be vaporized, but because the vaporizing device employed happened to be calibrated for the use of this particular insecticide. The purpose of the experiment was merely to determine the degree of uniformity and the quantity of insecticide deposit with and without the use of electric fans.

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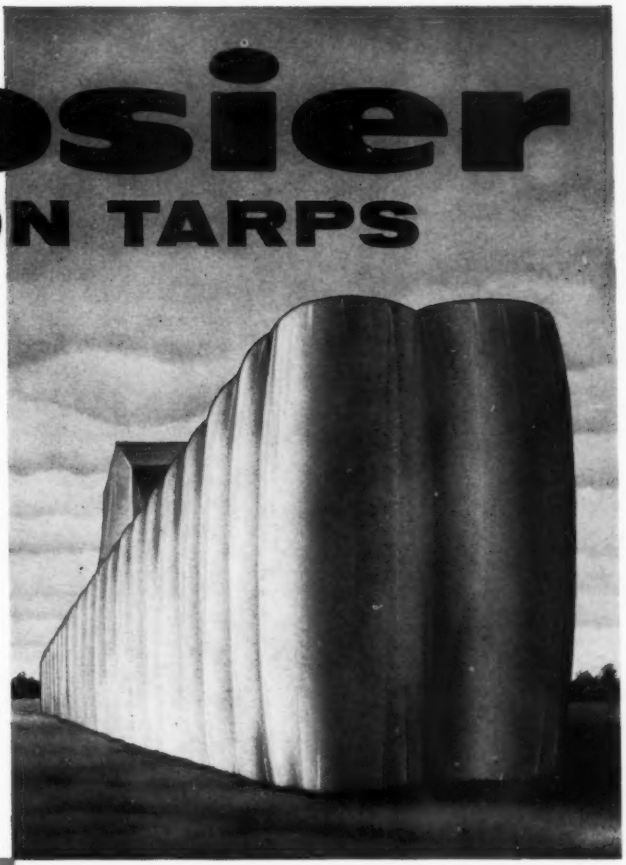

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was vaporized in 35 minutes. Three hours later the treated blocks were removed and another set of blocks placed in the same positions as before. The treatment was repeated as before except that a 16 inch fan was put near the vaporizer and a 10 inch fan placed in each of the two gabled attics.

The MLP's for dry-wood termites on blocks obtained from various parts of the attic are shown in Table 4. The locations progressively increased from A to D in their distance from the point of release of the vapor. In addition, location D was in a gabled portion of the attic with about 488 cu. ft. of space, but having an opening to the rest of the attic of only about 17 sq. ft. Table 4 indicates no difference in the amount of lindane deposited in the various locations, as far as can be ascertained by bioassay, except that in location D there was a much lower deposit than in the other three sites when no fan was used. When the three fans were in operation there was no significant difference in the amount of lindane deposited in the four locations. The amount deposited was apparently greater than when no fans were used, for the MLP's were on the average only 52% as great.

Treated blocks were placed back into the attic, along with those of the previous tests, to be periodically inspected for their residual effectiveness against dry-wood termites.

TABLE 4

Period required to kill 50% of dry-wood termites placed on blocks of wood treated in an attic with lindane vapor.[1]

Location of blocks in attic[2]	Median Lethal Period (Hours)* Without fan	With fan
A	30	15
B	27	18
C	31	21
D	58	22

*Significant difference at odds of 19:1, 7.8.

1. The treatment was applied on February 22, 1956. Five grams of insecticide was applied to 100 cu. ft. of attic space. The data are the average for three blocks, with 10 termites per block, used in each location.
2. The locations progressively increased from A to D in their distance from the point of release of the vapor. D was located in gabled portion of attic with only a relatively small connection with the rest of the attic. When the fans were operating, Location A was only 5 feet from one of the fans and in the direct current of air.

● Penetration of Insecticides Into Infested Wood

While working with dry-wood termites, we had occasion to test the effectiveness of liquid fumigants including dichloroethyl ether, which has shown great promise against beetle larvae in wood in the investigations of the Division of Wood Technology of the Forestry Commission of New South Wales, Australia, presumably because of its great penetrating power. In our test, the termites (**Kalotermes minor**) were sealed in cells between two blocks of Douglas fir wood so that they were 3/4 inch from the surface. Four sides of the blocks were sealed with electrician's tape, including the sides with the transverse cut. Liquid fumigants were painted onto the remaining two sides of the blocks by means of a brush. With dichloroethyl ether, all termites were found to be dead when the blocks were opened 10 days later. However, the proprietary product STD, which contains 19% ethylene dibromide and a small amount of DDT and chlordane in kerosene, and Woodtreat A, a paste emulsion of pentachlorophenol, also resulted in 100% mortality in 10 days under the same conditions. An advantageous feature of Woodtreat A is that its pasty consistency results in a large quantity being applied by brushing it on.

Paradichlorobenzene (PDB) vaporized in an enclosed space at the rate of 300 grams to 100 cu. ft. of space, and allowed to remain for 1 hour, resulted in 100% mortality of dry-wood termites in blocks of wood such as described previously. A saturated vapor of dichloroethyl ether with a 2 hour exposure was not effective.

The ability of liquid fumigants and vapors to pass through at least ¾ inch of wood is encouraging because dry-wood termites have the tendency of forming cavities that leave only a very thin layer of wood between them and the outer surface of the wood, at least throughout much of the infested area.

● Summary

During the past few years research activities in the Department of Entomology at UCLA have included: (1) photographing nearly all the structural and household pests of the United States, (2) development of an electronic device for the detection of wood-destroying insects, (3) development of a device utilizing infrared radiation for the "spot treatment" of beetles in floors, and (4) miscellaneous biological studies.

Among investigations now formally established in an Agricultural Experiment Station project are studies on the relative toxicity to the western subterranean termite of a series of insecticide-treated soils. These studies have shown that the relative

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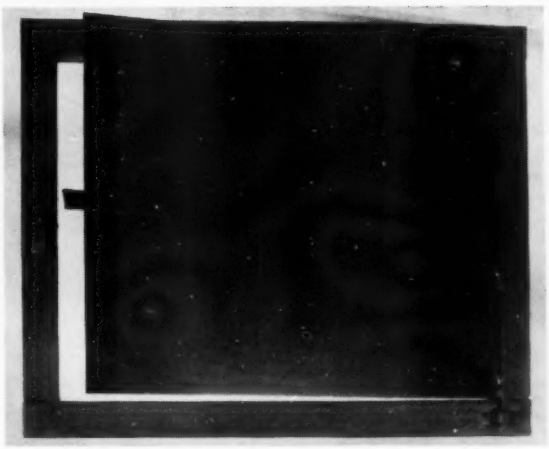

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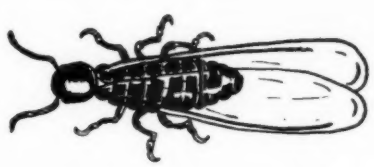

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effectiveness of the common insecticides against the western subterranean termite is far different than what has been reported for the eastern species. This suggests the desirability of long-term experiments with soil treatments directed against the western species under field conditions.

The effect of insecticide vapors beyond the limits of treated soil has been investigated. Of seven insecticides tested, the vapors of dieldrin and lindane, after passing through 1 inch of dry or damp soil, showed outstanding toxicity to subterranean termites.

Methyl bromide gas, liberated under polyethylene tarps, was able to kill subterranean termites and sawtoothed grain beetles buried in the soil to depths as great as 4 feet when applied at 1 pound to 50 square feet of soil surface.

A number of insecticides, as dusts, mists, and vapors, were applied to blocks of wood in an enclosed space at the rate of 5 grams to 100 cu. ft. of space. The residues showed a wide range of toxicity to dry-wood termites (**Kalotermes minor**), but in no case did the termites feed on treated wood. The blocks of wood are being kept in an attic and will be tested for their toxicity to dry-wood termites at yearly intervals.

Dichloroethyl ether, STD, and Woodtreat A, when painted in wood blocks, were able to kill dry-wood termites through ¾ inch of wood. The vapors of PDB were also effective.

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Verrall Named USFS Division Chief

Dr. Arthur F. Verrall has been named chief of the Southern Forest Experiment Station's newly formed Division of Forest Disease Research, Philip A. Briegleb, station director, announced in New Orleans last month. Dr. Verrall was formerly in charge of the Station's Wood Products and Tree Disease Laboratory in Gulfport, Miss.

The new division chief will be replaced at Gulfport by Dr. Paul C. Lightle. Dr. Lightle is being transferred from Placerville, Calif., where he has been conducting research on tree diseases.

Dr. Verrall will guide the Southern Forest Experiment Station's research on diseases of forest trees and decay and stain in forest products. The Station is a branch of the Forest Service, U.S. Department of Agriculture.

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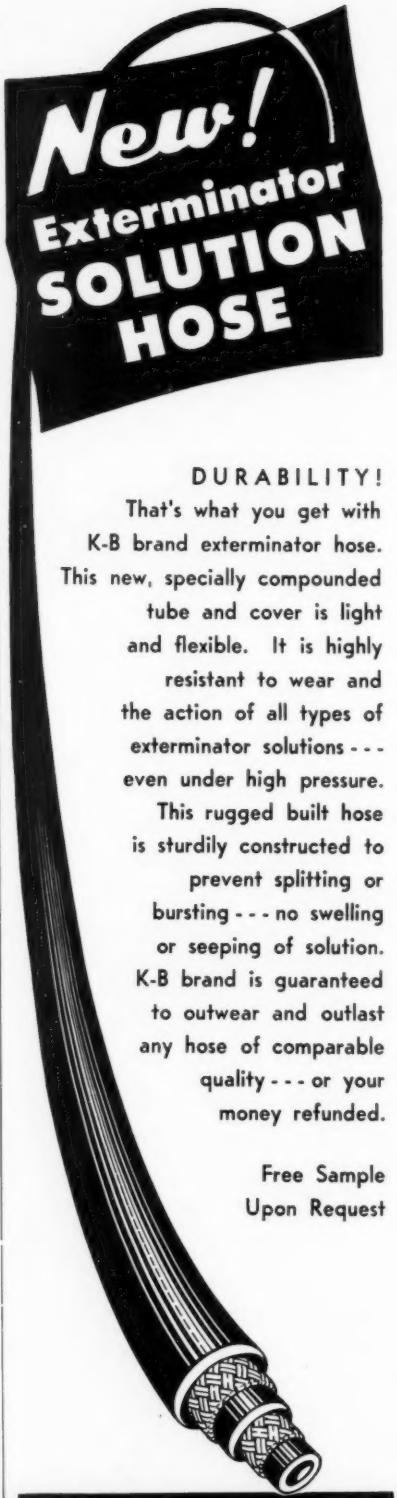

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That's what you get with K-B brand exterminator hose. This new, specially compounded tube and cover is light and flexible. It is highly resistant to wear and the action of all types of exterminator solutions - - - even under high pressure. This rugged built hose is sturdily constructed to prevent splitting or bursting - - - no swelling or seeping of solution. K-B brand is guaranteed to outwear and outlast any hose of comparable quality - - - or your money refunded.

Free Sample Upon Request

BROADWAY
RUBBER CORPORATION
529 East Broadway
LOUISVILLE 2, KENTUCKY

BUILD A PROFITABLE TERMITE CONTROL BUSINESS . . . WITH . . .

Vaccinol

BONDED CHEMICAL

For 25 Years . . . The Secret Formula
Termite Control Chemical That's . . .

Two Ways Better

1. STOPS TERMITE INFESTATION FOR MANY YEARS. A PROVEN RECORD OVER 25 YEARS.
2. EXCELLENT WOOD PRESERVATIVE.

Write for Exclusive Protected Territories
Available for Franchise Representatives

VACCINOL CHEMICAL COMPANY
2487 Pennsylvania P. O. Box 3205
Memphis 9, Tennessee

GOW-MAC GAS MASTER

PORTABLE FUMIGANT T/C INSTRUMENT

MODEL 210-F

Used by Leading Entomologists in these Outstanding Investigations

METHYL BROMIDE & LIQUID FUMIGANTS
* Forced air recirculation in grain storage.
* Gas dispersion within all types of structures

ETHYLENE DI-BROMIDE
* Penetration and persistence in soil under slabs

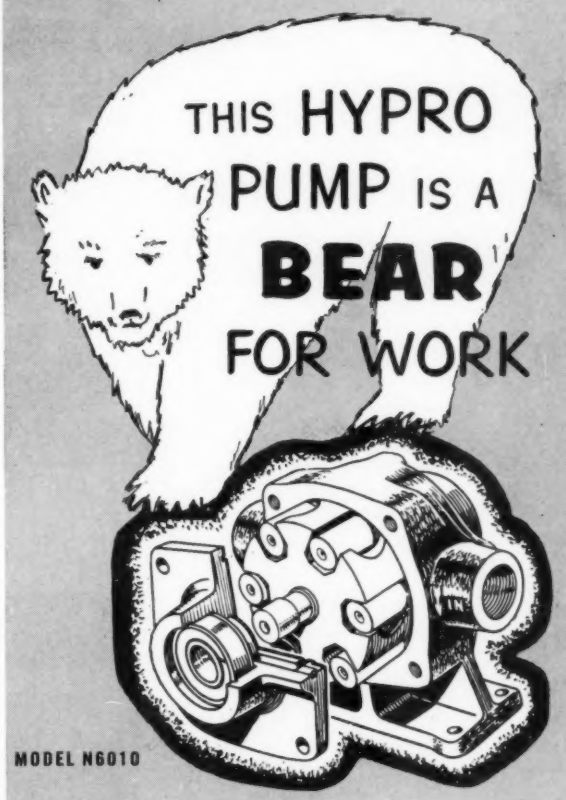
FREON 12
* Determining concentrations in air

Save time and material by using a Gow-Mac Gas Master.

Write Dept. 210-F for details of new combination unit calibrated 0-100 oz. CH_3Br in air.

GOW-MAC INSTRUMENT CO.
100 KINGS ROAD, MADISON, N. J.

THIS HYPRO PUMP IS A BEAR FOR WORK



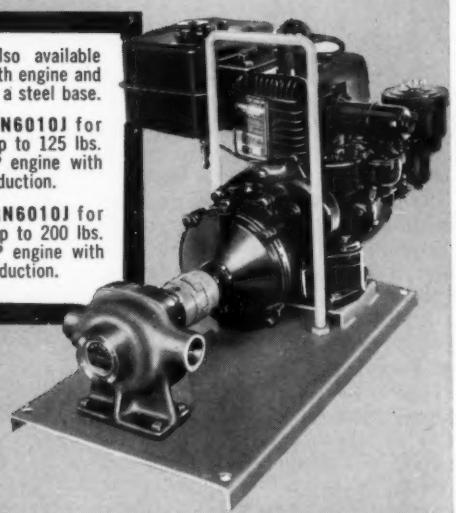
MODEL N6010

Long-wearing nylon rollers, ⅝ inch stainless steel shaft, corrosion resistant Ni-Resist case and rotor, ball bearings and cartridge-type seals make this Hypro pump (model N6010) an ideal choice for PCO's. Delivers up to 21 gpm (open discharge) or develops pressures up to 200 psi. Outlasts many ordinary pumps.

Pump is also available complete with engine and mounted on a steel base.

MODEL 3GN6010J for pressures up to 125 lbs. has 2½ HP engine with 6:1 gear reduction.

MODEL 4GN6010J for pressures up to 200 lbs. has 3½ HP engine with 6:1 gear reduction.



HYPRO PUMPS

WRITE FOR COMPLETE CATALOG

HYPRO engineering, inc.
700 39th Avenue N.E., Minneapolis 21, Minn.

How Much Is My Pest Control Company Worth?

(Continued from page 10)

ed cost to take care of expected volume including the value of the buyer's time which will be required to direct a newly acquired business.

• Question "Gross" Basis

Several of the equally prominent pest control executives interviewed questioned the soundness of agreeing to a fixed price based upon gross volume. It was their opinion such a determination overlooks the possibility that inefficient service schedules, worn equipment, or a high volume of low priced accounts may mean annual **net** take is low. Competitive pricing may also force a firm to offer much of its service just slightly above, or even under, what it costs to render it. These conditions spotlight the fallacy of valuing a business at its **gross** dollar volume. There may be no direct relation between how much business a company does and how much it makes for its owners.

• Termite Control Sales

A termite control business that has an established route of annual renewal-inspection-guarantee accounts which pay a yearly premium, has something concrete to sell. It is not likely a customer who has a re-inspection contract with a reputable termite control company will switch allegiance if new owners provide similar assurance, peace of mind, and protection that their property will not be destroyed by termites.

• Percentage Purchase Plan

One of the fairest purchasing agreements our editors uncovered ties purchase price to the ability of a PCO's company to hold its accounts for a period of two, three, four, or five years after a change of ownership.

Under such a plan, a buyer gives the seller a down payment of 20%, more or less, of the anticipated annual gross, based on the previous 12 months' billing. The buyer then agrees to give the seller 20% of the gross income from the acquired accounts each month for a period of three to five years, but payments during the first year are chargeable against the down payment. Both seller and new owner have duplicate copies of the list of transferred service accounts and monthly payments are made on the basis of that list.

Should an account discontinue, the new owner immediately notifies the seller who then has an opportunity to call the customer

Bus Advertising Ups Business For Ohio and Georgia PCOs

Hamilton, Ohio, PCO J. L. Purdy, uses this display sign on outside of city buses to advertise his Extermital Termite Service. Bus advertisement, appearing since April, has brought many termite inspection requests from home buyers, Purdy reports. Note professional appearance of advertisement which calls on people to termite protect their homes but makes no "cure all" claims or uses "scare" techniques.

In Savannah, Ga., F. H. Yates, of Yates Exterminating and Termite Control Co., also makes effective use of city bus advertising. This sign, measuring 12½ feet long and 32 inches high, is painted directly on side of a Savannah Transit Bus. The bus is periodically shifted from route to route giving advertisement city-wide coverage. Yates recently renewed his bus sign contract for another 12 months.

PESTMASTER* Methyl Bromide

more profits for fumigators

PEST CONTROL OPERATORS FROM COAST-TO-COAST are finding that PESTMASTER* Methyl Bromide Fumigant opens new avenues to greater profit.

HOUSE FUMIGATION. PESTMASTER* is deep-penetrating, effective, non-corrosive and can be used on all types of sealable buildings. It is effective in ridding premises of drywood termites, vermin, rodents and common insects.

FACTORY, WAREHOUSE & MILL FUMIGATION. PESTMASTER* is a highly versatile space fumigant that controls insects in all life stages at comparatively low rates of application. It is the best fumigant for edible foodstuffs.

QUARANTINE & TRANSIT FUMIGATION. Methyl Bromide's high order of toxicity and great penetrating power have made it the preferred and quite often the required fumigant in many of these operations. It is equally effective for bagged and packaged flour, cereal products in transit or storage, and living plants in the dormant stage.

GRAIN FUMIGATION. PESTMASTER* is unexcelled for custom fumigation of box cars of grains and foodstuffs. It has proved to be exceptionally effective and economical for fumigation of bulk grain in tanks, bins and other types of flat storage equipped with forced air circulation systems. Cuts fumigation costs as much as 50%.

Use coupon below for complete details on fumigation with Pestmaster Methyl Bromide Fumigant.*

MICHIGAN CHEMICAL CORPORATION
506 Bankson Street, Saint Louis, Michigan
Please send FREE PESTMASTER* FUMIGATION MANUAL.

Name_____
Firm_____
Street Address_____
City_____ State_____ Country_____

MC*

*Reg. U.S. Pat. Off.

MB-55-4

MICHIGAN CHEMICAL CORPORATION
506 Bankson Street, Saint Louis, Michigan
EASTERN SALES OFFICE: 230 Park Avenue, New York 17, New York

QUALITY PRODUCER OF PESTMASTER* DDT AND METHYL BROMIDE AND OTHER AGRICULTURAL CHEMICALS

to see if he can save it. If the customer still does not want to continue, the value of his account is deducted from the montly billing record.

In some cases, a new owner provides the seller with a monthly or quarterly report prepared by his auditors, or offers to let the seller's auditors check the records of service on acquired accounts.

Such a percentage plan is fair to both seller and buyer for it not only provides the seller with an extended regular income, subject to lower taxation, but also protects the buyer from loss of income through the mortality of weak accounts.

To be sure, the seller must be convinced the buyer is a capable, well-managed firm that can service the accounts as well as, or better than the seller and thus protect the business transferred so income during the purchase period will be protected.

Goodwill is an important factor in the pest control industry, but it is an asset of questionable value to a purchaser. It is also a costly item to include on your balance sheet for it cannot be depreciated, or charged off to expense.

An experienced and reputable firm should be able to pay the highest fair price for an established business since it has the required experience to hold more of the accounts than could be held by a newcomer in pest control.

Apparently each individual seller-buyer deal has to be considered on its individual merits, geographical location, competitive situation, and last, but not least, the management and ability of both parties in the proposed sale.

Cashes In On News With Next Day's Advertising

MILWAUKEE SENTINEL——TUESDAY, OCTOBER 25, 1955

Screen-Struck Mouse Blows WISN-TV Off Video Lanes

By ROBERT J. RIORDAN

A small gray mouse paid a visit to television station WISN-TV Monday morning, and he couldn't have been more unwelcome if he had a satchel full of bubonic plague.

He blew the station right off the air.

The clinical facts are these: At about 10 a. m., with Channel 12 on the air only about 15 minutes, a two-inch rodent committed trespass on the transmitter building on Belle Isle Dr. He snuggled up to the high voltage on a resistor, which is part of a transmitter tube which generates considerable heat.

NO MORE VIDEO

Result: C... vision char... mouse, and ... unfit for broadcast under FCC regulations.

Why did he do this mad, mad thing?

At first, a station spokesman tried to explain him away as a screen-struck candidate for audition on the Mickey Mouse Club, the new Disney network show, due on the air at 5 p. m.

MUCH WRONG

If this was his purpose, then personal ambition led him into treason to Mousedom. By mid-afternoon—and very close to Mickey Mouse time ... gineers were still ... ure out what ...

The next explanation was more plausible. When the weather gets snappy, said the spokesman, the little beasties of the field head for the indoors, such as TV transmitter stations, and such tragedies as this one are "not terribly uncommon in the industry."

The television industry, that is—not the mouse industry.

LAST MOMENTS HOT

If this was his purpose, Mouse ... smasher. He was never ... life as he was ... ient of it.

...ance, up there ...'atless Hunting ...n hear what ...out him at but ...TV, then his ...ing.

WEDNESDAY—

KNOCKED OUT BY A MOUSE!

The most destructive mouse in modern history is the mouse that recently knocked out one of our large Milwaukee television stations.

It's amazing the amount of damage a little mouse can do. Don't take chances. If by chance you are troubled with rats or mice . . . be sure to call me . . . FRanklin 2-3390.

ED BATZNER, THE FRIENDLY EXTERMINATOR
1116 W. North Ave. Phone FR. 2-3390

Ed Batzner, Milwaukee, Wis., PCO, has a sure method to make the most effective use of his advertising dollar. He puts the news pages of his local paper, **The Milwaukee Sentinel**, to work for him.

Each day, Batzner carefully scans the Milwaukee paper. When he finds a story that ties in with pest control he runs an advertisement in the next day's issue calling the public's attention to the fact that his company offers protection against this type of pest.

This tying in of advertising with news events makes for a much more effective and personalized sales message because the prospective customer can see the pest control services from the standpoint of specific benefits, Batzner reports.

Above is a news story which appeared in **The Sentinel** about a mouse causing one of Milwaukee's TV stations to go off the air for several hours. Under the story is the advertisement Batzner ran in the next day's issue specifically referring to this story and advertising that his firm is ready and able to provide mouse control service.

Sanitation Firm Incorporates

Incorporation and expansion of Industrial Sanitation Counselors, Louisville, Ky., has been announced by Mohe H. Solworth, president. The firm is a management consultant company specializing in setting up efficient cleaning programs for business, industrial and public buildings.

Solworth said the new organization will consist of a parent corporation, Industrial Sanitation Counselors, and three subsidiary corporations, Industrial Sanitation Counselors of Louisville, Industrial Sanitation Counselors of New York and Industrial Sanitation Research, Inc. The home office will remain in Louisville.

Chemagro to Build in K. C.

Chemagro Corp., of New York, supplier of Dipterex and Chlorthion, will build a $2 million agricultural chemicals manufacturing plant in Kansas City, Mo., according to G. W. Hill, Jr., president. The firm has purchased 25 acres from the Kansas City Southern Railway and has taken an option of 25 additional acres for future expansion.

Every

MAGNOLIA PRODUCT *is Guaranteed*

MAGNOLIA CHEMICAL CO. OF TEXAS, INC.
3205-11 Oak Grove St., P. O. Box 8043
Dallas 4, Texas

Send us price list on your complete line of pest control chemicals.

(please print)

Company .....

Street Address .....

City ..... Zone ..... State .....

Signed .....

to give COMPLETE SATISFACTION

A Complete Line of Chemicals for the PCO!

Ready to ship from stock

Shipment made Same Day Order Received

Magnolia 18% Dieldrin
Magnolia Vita Life Liquid Fertilizer 10-10-5
Magnolia 50% Malathion
Magnolia Lindane 20% WE Concentrate
Magnolia Lindane Crystals
Magnolia Benzene Hexachloride
Magnolia Pentachlorophenol 44%
4 lbs. Penta per gallon
Magnolia DDT 25% W E Concentrate
Magnolia DDT 25% O S Concentrate
Magnolia Knox-01 5-3-1 Spray
Magnolia 46% W E Chlordane
Magnolia 74% W E Chlordane
Magnolia 22% O S Chlordane
Magnolia Thanite
Magnolia Piperonyl Butoxide
Magnolia Pyrethrum Extract
Magnolia Aldrin
Magnolia Toxaphene
Magnolia Orthodichlorobenzene
Magnolia Mosquito Larvacide
Magnolia Fogging Machine Concentrate
30% DDT, 15% Chlordane, 15% Thanite
Magnolia Lethane

Magnolia Insecticide Dusts
Sodium Fluoride
5% Chlordane
10% Chlordane
40% Chlordane Water Emulsion
Arsenate of Lead
Paris Green
5% Malathion Powder
3% B. H. C. Powder
5% D. D. T. Dust
10% D. D. T. Dust
1.5% Dieldrin Dust
2.5% Dieldrin Dust
1% Lindane Dust
10% Toxaphene Dust
50%D. D. T. W E Dust
Magnolia Ram Warfarin Rat Killer
Magnolia 50% DDT Mouse Trailing Poison
Pink Color
Magnolia Pyrethrum Roach Powder
Magnolia Moth Spray
Magnolia Perfumed Moth Crystals
Magnolia Water Emulsion Dormant Spray Oil
Magnolia Deo Base Oil for Insecticides
Magnolia Deodorizers and Masking Essential Oils

Assistance on all your pest control problems at no charge

Write Magnolia Chemical Pest Control Specialists for Advice based on 25 Years of Experience

Send in above Coupon for Prices Today!

MAGNOLIA CHEMICAL CO. OF TEXAS, Inc.

P. O. Box 8043 University Park Station

3205-11 Oak Grove St. Dallas 4, Texas

What's NEWS In The Industry

Chicago Tot's Death Again Focuses Spotlight on City's Rodent Program

Death of a month-old Chicago infant from multiple rat bites and serious injury to the child's two sisters has brought a demand from aroused citizenry that the city "re-evaluate" its current rodent control program. Only a few months ago, the city's new administration, headed by Mayor Richard J. Daley, kicked off a new program aimed at making Chicago rat conscious.

This was just another in the series of programs conceived during the last few years to rid Chicago of its teeming rat population. But how many rats actually infest homes, alleys and vacant lots in Chicago? And what is being done to control them?

According to Dr. Herman Bundesen, Chicago Health Commissioner, there are about 1.7 million rats in metropolitan Chicago. This adds up to about one rat for every two human beings. Although only one rat-caused death has been reported this year, 130 people were bitten in the first six months of 1956. In 1955, 202 rat bites were reported and in 1954 there were 232.

Dr. Bundesen said the board of health's insect and rodent control section processes about 10,000 to 15,000 complaints a year from citizens who say they have rats in their homes.

A. E. Marks, health department rodent expert, reports of the city's 20,000 blocks, 4,757 were "treated" in the first six months of 1956. "But the big job ahead is to convince housewives that metal garbage cans with tight-fitting lids are the best prevention against rodents," Marks said.

Rodent control budget in Chicago is about $130,000 annually, with $100,000 provided by the bureau of streets and sanitation and the balance by the board of health. Twenty-seven laborers from the sanitation bureau do the actual mopping up operation against rats. Five inspectors from the building department supervise operations and check on dwelling and business places on a regular schedule, Marks says.

Ky. PCA to Meet Nov. 19-20.

Annual convention of the Kentucky Pest Control Association will be held at the Campbell House, Lexington, on November 19 and 20.

Speakers lined up for the two-day meeting include: Dr. John V. Osmun, head of Purdue University's entomology department, Lafayette, Ind.; Ira Hatfield, Wood Treating Chemicals Co., St. Louis, Mo.; Dr. Ralph E. Heal, National Pest Control Association executive secretary, New York; George L. Johnson, Kentucky Department of Agriculture, Frankfort; Myron W. Smith, Hill-Smith Termite Control Co., Memphis, Tenn.; and Professor W. A. Price, University of Kentucky, Lexington.

Full details on the convention can be obtained from association secretary Clem Lindsey, Lindsey Pest Control, 1014 Republic Building, Louisville, Ky.

New Geigy Chemical Company headquarters near Ardsley N. Y., includes air-conditioned administration and cafeteria buildings, as well as a laboratory and service building. The entire plant is built of reinforced concrete with exteriors of insulated white porcelain enamel panels. Construction of an additional laboratory for pharmaceutical research is planned.

Sam Reid is new California PCOA secretary.

Reid Succeeds Strong As California PCOA Secretary

Sam Reid, a native of San Francisco, has been appointed executive secretary of the Pest Control Operators of California, Inc. He succeeds Virgil E. Strong who left that post after four years service July 1 to accept a position as general manager of Delk Pest Control Co. in Fresno.

Before accepting his post as executive secretary, Mr. Reid was general manager of the Far Eastern Foundation, in San Francisco. Experienced in both administrative and public relations work, Mr. Reid has worked for the Union Pacific Railroad, Mellon Interests, and Central Intelligence Agency.

During World War II, he spent four years in the U. S. Navy as a navigator on a destroyer. He is a graduate of Stanford University with an A.B. degree in political science.

Find Oriental Roach in Fla.

According to Ashley B. Gurney, insect identification expert from the U. S. National Museum in Washington, D. C., there are few published records of **Blatta orientalis** L. from Florida, but a specimen from the Tampa, Fla., region has been so identified. Tampa PCO, Joe Gross, picked up the suspected roach and sent it to Washington for identification, since most often similar roaches are confused with the Florida wood roach. Gurney's report confirmed Gross' identification that his find was an oriental roach.

KILL Rats-Mice!

with Donaco Pival RODENTICIDES

Complete Rodent Control **in 10 to 14 days!**

Now—science's greatest contribution to effective rodent control! Donaco contains Pival, the new and superior anti-coagulant poison that destroys whole colonies of rats and mice in 10 to 14 days—eliminates "bait shyness" and reduces the hazard to humans and domestic animals to an absolute minimum.

Donaco

TRADE MARK

The Only Complete Line in the Rodenticide Field!

DRY MEAL BAIT

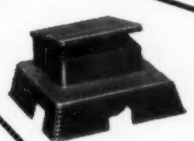
A cereal type bait far more acceptable to rodents than the choicest natural foodstuffs. Retains its high palatability indefinitely . . . resistant to mold growth and insects. Sealed in 1½ lb. and 3 lb. tin cans.

Liquid BAIT

One packet dissolved in a quart of water provides rodents with a tasty solution 10 times more acceptable to them than plain water. Contains Pivalyn, the water soluble sodium salt of Pival.

Liquid Bait DISPENSER

The only liquid dispenser on the market designed specifically for rats and mice! Holds one quart of water. Small evaporation area assures long term effectiveness without frequent refillings. Made of strong, durable Styron. 5¼" high.



Mouse BAIT STATION

Complete with 4 oz. package of dry meal bait (enough to kill 40 mice). Specially designed for safe, efficient control of mice. Far superior to any trap. 4 oz. bait package fits into station—releases bait as mice feed. Station is 2⅛" high, 6" wide, 5" deep.

HIGH PALATABILITY • MOLD RESISTANT • INSECT RESISTANT

Dealer Inquiries Invited—For further information write, wire or phone D. W. Cluff

DONCO, INC. 1150 W. HAMPDEN, ENGLEWOOD, COLORADO

Aerial Battle Against Fruit Fly Continues

Aerial spraying continues against the Mediterranean fruit fly around Miami, Fla. In addition, "touch-up" spraying in other areas, and trapping surveys are in progress or planned in several areas outside the State, the U. S. Department of Agriculture reports.

Insecticidal spraying, chief weapon in the intensive Federal-State control and eradication program, is being concentrated on remaining trouble spots within three counties on the southeastern Florida coast. A contract for additional aerial sprayings on some 40,000 acres in the Miami area has been signed with United-Heckathorn Company.

Arrival of additional detection traps is permitting wider Medfly trapping in the Everglades and on offshore islands. The search for this fruit and vegetable pest will be extended to ports on the Gulf of Mexico, South Atlantic coast, Mexican border, and as far away as Puerto Rico, the Virgin Islands, and Jamaica, Department officials say.

Medfly is one of the world's most destructive insects. Photo courtesy L. F. Steiner, USDA.

Six aerial applications of insecticidal bait spray have been made over most of the area of general infestation in Dade, Broward, and Palm Beach counties, totaling more than 300,000 acres.

The fly has been found in 27 Florida counties since its discovery in the State April 13. Most of the 1,392 properties infested are in Dade, Broward, Palm Beach, Lee, and Pinellas Counties. These counties, along with Hendry and Collier, are under Federal quarantine. At least a few flies have been found at points in every county south of and including Pasco, Polk, Lake, Seminole and Brevard counties. The most southerly find recorded was at Key West, where a single fly was trapped.

More than half a million acres have been sprayed with baited insecticide in the Medfly program. All of these acres received repeated treatments. Cumulative aerial bait spray applications, including the many multiple applications given most areas, have now passed the 2½ million-acre mark. Single engine aircraft sprayed almost 1½ million acres, and multi-engined planes treated most of the remainder. Jeep-mounted hydraulic and blower-type sprayers and hand sprayers also applied bait spray. In addition, one-time surface applications of granular insecticide to soil have been made with hand seeders on several thousand acres to supplement the aerial sprays. Granular insecticide was also applied by aircraft to small acreages in groves.

SMO-CLOUD

Moth-Cloud

and

Bug-Tab Tablets

MURDERS

CRAWLING & FLYING BUGS AUTOMATICALLY

A new fog-type bug killer designed for destroying roaches, waterbugs, ants, flies, mosquitoes, sandflies, gnats, clover mites, spiders, silverfish, wasps, flying moths and certain other small exposed crawling and flying insects. Registered with the United States Department of Agriculture. Made and used by professional exterminators. NEW! MOTH-CLOUD AND BUG-TAB insecticidal smokes in TABLET FORM now available. MOTH-CLOUD kills moths, larvae and carpet beetles. Send for literature and samples.

PRICES

SMO-CLOUD — 2 oz. can — $7.80 per dozen postpaid

MOTH-CLOUD — (25 tablets to a bottle) — $5.40 per dozen bottles postpaid

BUG-TAB — (25 tablets to a bottle) — $5.40 per dozen bottles postpaid

CONTINENTAL CHEMISTE CORP.

2256 West Ogden Avenue Chicago 12, Illinois

Fiberthin *cover* lies over seed bed as fumigation gas is applied in North Carolina field tests.

FIELD TESTS PROVE U. S. FIBERTHIN PERFECT AS FUMIGATION COVER

Rugged field tests conducted in North Carolina revealed some amazing facts about U.S. Fiberthin*. As a fumigation blanket for tobacco seed beds, the cover was used *13* times and is still in excellent condition, ready for several more seasons of use. While ordinary fumigation covers tend to tear easily when placed over rough surfaces, Fiberthin resists tearing.

Vinyl or neoprene coated nylon Fiberthin is actually 4 times stronger in tear strength than #8 cotton duck—yet it's 40% lighter! This material derives its strength from its unique construction of untwisted ribbon-like nylon threads which shift to meet stress or strain.

Fiberthin seals fumigation gases in, keeps air out! It has remarkable flexibility and can be handled with a maximum of ease. Rain water and moisture roll off it and it is resistant to oils, alkalies and mildew.

Fiberthin comes in various weights and widths, vinyl or neoprene coated. Colors are: black, white, tan, olive drab, blue, gray, green, red and aluminum. Specify Fiberthin when you order protective covers from your supplier or send for information to: United States Rubber, Coated Fabrics Dept., Mishawaka, Indiana.

*Pat. No. 2,619,705. Dec. 2, 1952

United States Rubber

Industrial Fumigant Co.

(from page 30)

excreta contaminating wheat," Pugh said. "The clean-up in stations has been remarkable."

"The new Food and Drug laws will help the fumigation industry tremendously," K. S. Hart, president of the Kansas City Board of Trade, says, "but not so much industrially as on the farms. That's where the lag has been, and producers are learning they are going to have to correct storage conditions on the farm just like elevator men at the country and terminal level have done."

W. H. Schoenherr, Danville, Ill. entomologist, told 250 members of the Grain Elevator and Processing Superintendents Association at Kansas City recently that farmers were only penalizing themselves by failing to observe proper sanitation measures. He said in February, 39 cars of wheat out of 50 inspected with a grain probe by a Danville dealer carried live weevils.

"Introduction of tighter regulations," Munger says, "will be a good thing for the milling, grain and fumigation industries, but a better thing yet for the country as it represents a consumer."

MGK Insect Repellent

McLaughlin Gormley King Co., of Minneapolis, Minn., is marketing a new repellent for use in dairy barns to repel flies, mosquitoes, roaches. Called MGK Repellent 11, the new compound, a butadiene derivative patented by Phillips Petroleum Co., is said to be the first such repellent to receive Food & Drug Administration and U. S. Dept. of Agriculture okays for use on cattle and in barns.

Calendar

Master Pest Control Operators of Dayton Monthly Meeting, Snack House, Dayton, Ohio, Oct. 31.

Communicable Disease Center Mosquito Control Training Course, CDC Field Stations, Seattle, Wash.; Denver, Colo.; Oklahoma City, Okla.; Atlanta, Ga.; Indianapolis, Ind.; Pittsburgh, Pa.; Mt. Vernon, N. Y.; Amherst, Mass.; Nov. 5-9.

Virginia Polytechnic Institute PCO Short Course, V.P.I., Blacksburg, Va., Nov. 7-9.

American Public Health Assn. 84th Annual Meeting, Convention Hall, Atlantic City, N. J., Nov. 12-16.

U. S. Fish and Wildlife Service Rodent Control Short Course, Health Building, Columbus, Ohio, Nov. 15-16.

Eastern Branch, Entomological Society of America Meeting, Hotel Haddon Hall, Atlantic City, N. J., Nov. 19-20.

Kentucky Pest Control Association Convention, Campbell House, Lexington, Ky., Nov. 19-20.

National Sanitary Supply Assn. 1st Western Trade Show, Ambassador Hotel, Los Angeles, Cal., Nov. 25-27.

Missouri Pest Control Assn. Conference, Union Building, University of Missouri, Columbia, Nov. 30-Dec. 1.

Chemical Specialties Manufacturers Assn. 43rd Annual Meeting, The Mayflower, Washington, D. C., Dec. 3-5.

Texas Pest Control Assn. Convention, Herring Hotel, Amarillo, Dec. 6-8.

Nebraska Assn. of Pest and Termite Control Operators Meeting, Lincoln Hotel, Lincoln, Dec. 7.

Entomological Society of America National Meeting, Hotel New Yorker, New York City, Dec. 27-31.

North Carolina Annual PCO Short Course, State College, Raleigh, Jan. 15-17.

Oklahoma Pest Control Conference, Oklahoma A. & M. College, Stillwater, Jan. 21-23.

21st Purdue PCO Conference, Purdue University, Lafayette, Ind., Jan. 28-Feb. 1.

NEW

Air refresher and deodorant

Effective Metazene type bomb that kills odors like magic. Not a masking agent but actually destroys odors chemically.

Available in "Odorless" formula where no after odor is wanted. Also Spring Pine, Green Bouquet, Clover . . . delicate, fresh pleasing odors.

Made for your satisfaction.

ORB deodorant controls a wide variety of odors such as: Hospital, smoke, animal, bathroom, food and cooking, tap room, and many others.

Priced for your profit.

ORB is a real profitmaker for PCO's to use and sell. Three sizes: ¾, 1 and 3 lb.

Special trial offer.

Order from this ad. One dozen, 1 lb. assorted odors, $12.00 F.O.B. Prepaid if check with order.

ORB high potency Pyrenone insect bomb for food industry use.

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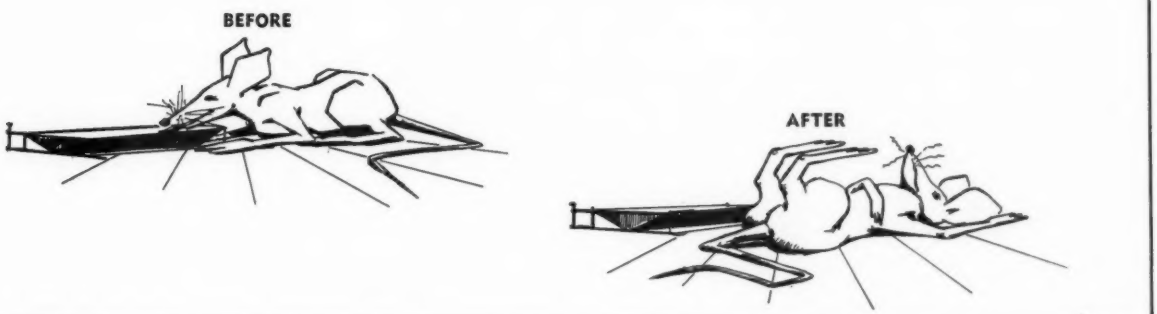
TULL CHEMICAL CO.



10 years experience in 1080® manufacture on proven equipment. The potency of 1080® is dependent upon its sodium **mono**-fluoroacetate content — the most active of all sodium fluoroacetate salts. All dye used bioassayed for rodent acceptance. The effectiveness of 1080® depends upon its potency and rodent acceptance.

Containers: **8 oz. Cans — ½ pound, 1 pound, 25 pound boxes**
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Shipment Made By Railway Express

1080® was formerly manufactured by Monsanto Chemical Co.

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TULL CHEMICAL COMPANY

Phone ADams 7-2548

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Letters
(from page 6)

without the presence of poison dusts, so the inclusion of irritant mentioned by Mr. Jeffrey appears to be merely a waste of effort.

It seems Mr. Jeffrey is not very well versed on the rodenticides and insecticides at his disposal. Pival and its derivatives have been used in this country for some time. So have malathion and allethrin. Rotenone, a component of derris, was one of the earliest insecticides in use. I am sure Mr. Jeffrey would have no difficulty in obtaining some quite simply here if he really wants it. Diazinon was recently used with excellent results for the control of flies at the Royal Easter Show.

Finally, the subject of fumigants must be discussed. Cyanide is indeed used for fumigation of ships and mills because it entails least cost and is quite effective. Warehouses are fumigated nowadays to a much lesser extent, partly because fogging with recent insecticides has been found more satisfactory, and partly because companies are better educated in methods of preventing insect attack. As for grain silos, the Australian Wheat Board has carried out extensive experiments in the control of grain pests, and methyl bromide, which gives excellent results, is used at the rate of many tons each year. Aluminum phosphide is also very satisfactory for this work.

I would like to point out that the complaints registered by Mr. Jeffrey should not be taken as a reflection on the scientific institutions in this country. It would only have been necessary for him to inquire and all information he so badly needs would have been supplied by any of the Commonwealth or state scientific branches.

E. B. Huddleston

Chief, Division of Wood Technology
Forestry Commission of New South Wales
Sydney, Australia

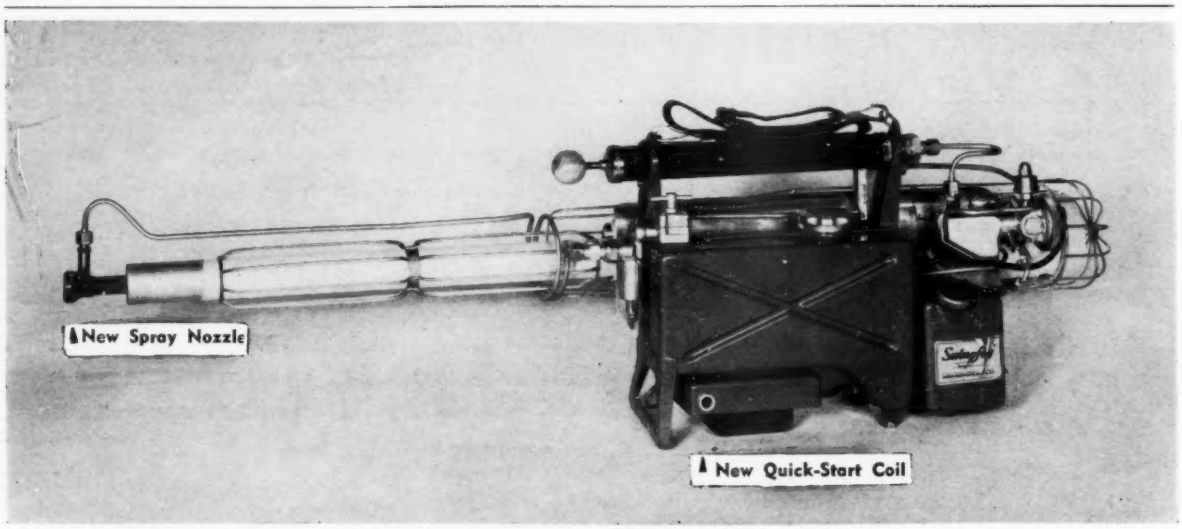
Harlan Shuyler demonstrates specially calibrated meter which is said to accurately measure the volume of chemicals applied during soil poisoning. A totalizer on the meter reportedly makes accurate job-costing and inventory control possible for the first time in termite control history. Shuyler's company, Conservation Industries of 3138 State Avenue, Kansas City 2, Kan., is distributing this new metering valve.

Melon Fly Found in Calif.

Discovery of a single melon fly on the campus of the University of California at Los Angeles has state agricultural officials praying that this doesn't signal an invasion of these pests which might cause $200 million crop losses.

Discovery of this pest parallels the situation in Florida early last April when the Mediterranean fruit fly was found infesting citrus groves near Miami.

This melon fly is the first of its kind ever trapped in America. Agricultural officials say the gaudy, brilliantly marked fly is capable of inflicting staggering losses on crops and fruits.



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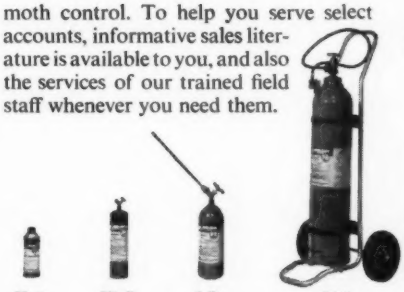

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Termite-Repellent Preservative

(from page 34)

intervals would give sufficient treatment. Furthermore, diffusion patterns of the oil and penta in the wood indicated the band of treatment should not be extended to the top or bottom of a joist, for instance. To do so gives an excess of material that might either creep up into the flooring or cause "drip" from lower portion of the band. Experiments showed banding at 1 foot intervals with a ½ inch thick band gave better treatment than was obtained by drilling and injecting liquids (Figure 3, page 32). It was also demonstrated that the band need not extend closer than 1 inch on the top side of the joist, and the band should taper off in thickness at the bottom edge to eliminate dripping of oil from these lower edges.

Sufficient research on equipment has been carried out to show that mechanical applicators can be used very satisfactorily. Our best results to date have been obtained with both hand and power (air pressure) operated equipment manufactured by the Alemite Company of St. Louis. Figure 4, page 32, shows one of the air operated applicators with an attachment worked out in the Wood Treating Chemicals Company research laboratories.

The product and process have been sufficiently tested so that termite control operators can proceed to utilize this new method of treatment.

Hatch Is NACA President

Fred W. Hatch, manager of the agricultural chemical division, Shell Chemical Corporation, New York, was elected president of the National Agricultural Chemicals Association at the group's recent annual meeting in Spring Lake, N. J. He succeeds W. W. Allen, manager of agricultural chemicals sales for the Dow Chemical Co., Midland, Mich.

Other new NACA officers are: vice president, J. V. Vernon, president of Niagara Chemicals Division, Food Machinery & Chemical Corp., Middleport, N.Y.; and directors, Arthur W. Mohr, president of California Spray-Chemical Co., Richmond, Calif.; George R. Vila, assistant general manager of Naugatuck Chemical Division of U. S. Rubber Co., Naugatuck, Conn.; and T. L. Wilkerson, general sales manager of American Cyanamid Company's agricultural chemicals division, New York. Lee C. Hitchner continues as NACA executive secretary.

VPI Short Course Nov. 7-9

Virginia Polytechnic Institute, Blacksburg, will hold its annual short course for pest control operators November 7-9. The three-day meeting is being sponsored by the Virginia State Pest Control Association, U. S. Fish and Wildlife Service, and the Agricultural Experiment Station and Agricultural Extension Service of VPI.

Subjects to be covered at this year's conference include: insect phobias, public health hazards, small animal pest problems, wood-destroying insects, fungi, termite control, identification techniques, equipment, resistance and safety.

For additional information on the program, registration fees, and lodging contact Dr. J. O. Rowell, extension entomologist, VPI, Blacksburg, Va.

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Effect of Temperature On Insecticide Toxicity

(from page 16)

from 62° to 82° F. Many of the organophosphorus compounds have been shown to be good fumigants, and thus a relatively high temperature would be expected to increase their efficacy. The mode of action of the phosphorus toxicants is generally accepted as being one of inhibition of cholinesterase.

Most of the data reported thus far were obtained under constant temperature conditions at the time of application and during the post-treatment period. Obviously, however, under natural conditions more than one temperature may be responsible for the ultimate effect. The temperature during application determines the immediate toxicity or rate of uptake while the post-treatment temperature determines the rate of recovery.

In residue tests with DDT, Lindquist **et al.**[6] repeatedly obtained a higher mortality of house flies at the lower holding temperature, irrespective of the exposure temperature. Pradhan[9] found that when red flour beetles were exposed to a residue of DDT for 24 hours at the same temperature and then kept away from it at a different temperature there was a higher kill at the lower temperature. Similar results are usually obtained with fumigants and inorganic stomach poisons. Evidence by Potter and Gillham[7], however, does not indicate that nicotine was any more effective at a low than at a high holding temperature.

• Further Research Necessary

A general practical application of the temperature relationship to toxicity as we know it now

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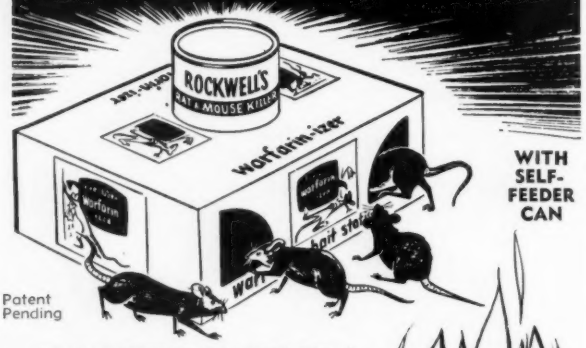

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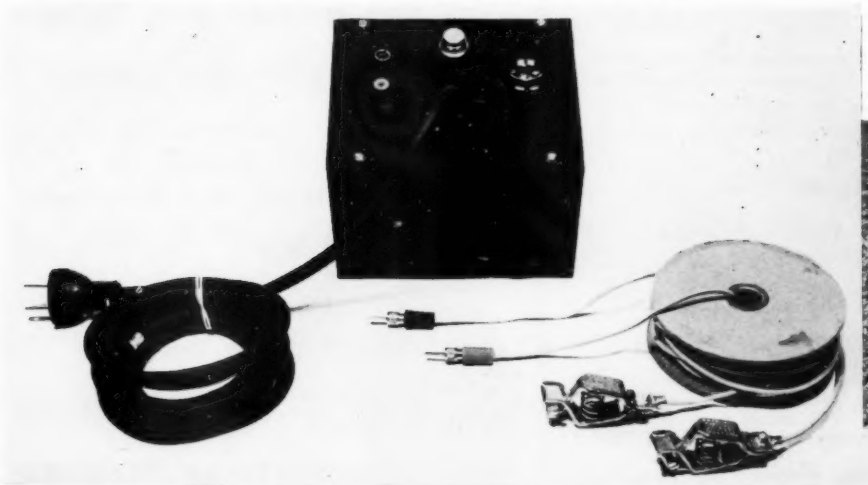

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seems to be to apply the insecticide at warm temperature when a cooler period is to follow. These conditions might suggest treatment in late afternoon. However, because of the complexity of the relationship we are not ready to make a broad general recommendation. Further basic research concerning the mode of action of each insecticide as it relates to temperature as well as other ramifications is urgently needed.

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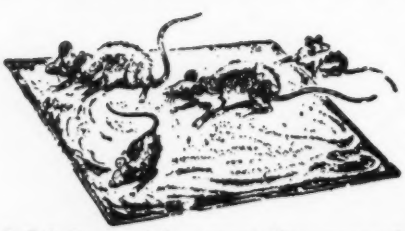

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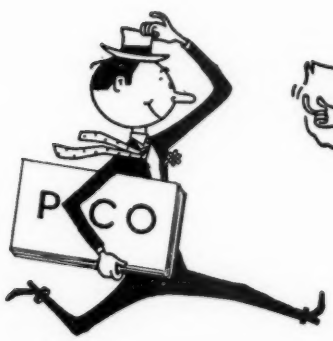

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Notebook

TIPS AND IDEAS FROM THE FIELD

Anonymous Alcoholics

By Myron W. Smith
Hill-Smith Termite Control Co.
Memphis, Tennessee

A few years ago we were stunned by a call from the manager of a local liquor store who said termites had robbed him of some of his finest champagne stock.

We got right to work on this one! Our examination of the liquor store disclosed termites were penetrating an expansion joint in their concrete-floored building. Tunnels were found following a wood rack on which the champagne was being stored.

These termites had built their tubes right to the inverted ends of the champagne bottles and had drilled a single hole through the foil wrapping and cork to get at the contents. They had done this to 20 bottles, and while most had been emptied, some still contained a small amount of the high priced brew, as well as a few termites.

Because only one hole was drilled through the cork of each bottle and since some of the bottles had been completely emptied, we believe our subterranean friends sampled the contents and liked what they found.

Correction of this infestation required only the localized drilling of the expansion joint and flooding with our usual soil poison treatment.

New Buildings Favorable For Structural Pests

(from page 20)

the shrinking and checking of lumber and timbers produce conditions favorable for an additional number of pests, so that buildings of perhaps 50 to 100 or more years of age may again have a greater number of pests than more recent structures.

• Summary

New buildings (one to four years old) are favorable to the establishment of certain pest species and to an increase of abundant populations, because of temperature and moisture conditions and plentiful food supplies. Older structures probably offer less favorable physical conditions, with more limited food supplies for a number of pests. Still older buildings, because of the accumulation of certain debris and other elements suitable as food, and accessability to food supplies in wood, may be attractive to certain pests of specialized food habits. Thus, new structures may have a greater abundance of arthropod pests, older buildings smaller numbers, while still older structures may again be favorable for an increased number of these pests.

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Associated Products Moves

Associated Products, Inc., has moved its offices and plant to new and larger quarters at 1479 Glenn Ave., Glenshaw, Pa. New phone number is Hunter 6-2255.

PROTECT BUILDINGS

from Pigeons - Starlings - Sparrows

POSITIVE — The Cartridge contains the same material used by our own staff on contractual jobs where a one year guarantee is given to the customer.

HUMANE — The compound does not kill or injure the birds in any way. Birds are instinctively afraid to land on Bur-Co.

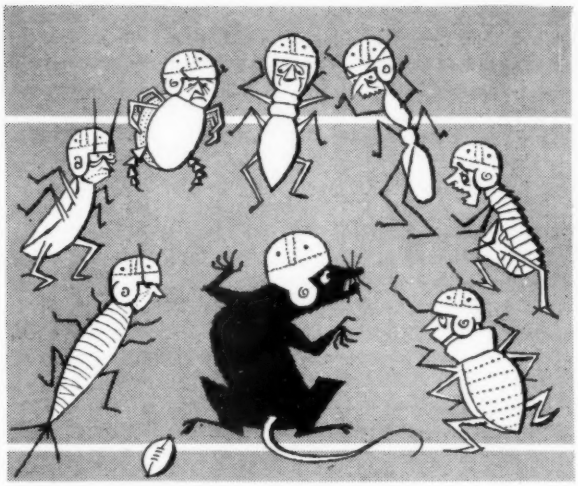
SAFE — Bur-Co Bird Repellent is absolutely non-poisonous. It also is safe to use on all surfaces, wood, paint, cement, stone, metal or brick.

ECONOMICAL — The small cost of the repellent and the ease of application will return you dividends.

New Handy Pack Cartridge and Applicator gun makes it an easy job for P.C.O. to completely rid buildings of roosting birds. Write for prices on gun and cartridges plus our new folder. Also about equipment for large commercial program.

Due to BUR-CO BIRD REPELLENT, this church is now completely free from pigeons. Protect your buildings too with BUR-CO.

BURR CHEMICAL COMPANY Dept. 3, 3329 Auburn Ave., Rockford, Illinois



HEY FELLAS! that

CERTOX

TEAM IS REAL POISON!

. . . they can't make headway at all against *this line* of pesticides . . . they don't make them more effective! For a touchdown of pesticide values Get CERTOX Today!

- DIAZINON
- CHLORDANE
- DDT
- DIELDRIN
- PENTA
- SOD. FLUORIDE
- WARFARIN
- DIPTEREX
- LINDANE
- MALATHION
- PYRETHRUM
- ORTHO
- CYANOGAS
- PIVAL

all other RODENTICIDES

Write for FREE CATALOG

YORK
CHEMICAL CO., INC.
23 Dean St., Brooklyn 1, New York

4 powerful weapons for better PEST CONTROL

SPRAYING SYSTEMS
GunJet®
Series No. 42
SPRAY GUNS

For fast coverage and control. Throws spray up to 49 feet at 100 lbs. pressure. Adjustable spray, easy trigger control and lock. Hardened stainless steel tips. Choice of capacities. Write for Bulletin 80.

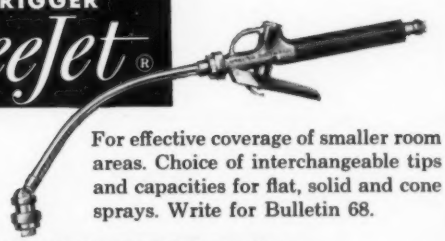
SPRAYING SYSTEMS
InsectoJet®
SPRAYER

Gives effective coverage in plant or room area 30x60 feet in less than two minutes. Highly atomized fog-type spray. Air pressure at 20 to 35 pounds siphons liquid from plastic jar. Jar unscrews for refilling. Write for Bulletin 74.

SPRAYING SYSTEMS
CHLORINE SPRAYER
No. 5870

Far reaching spray with air pressure. Quickly covers large area and hard-to-get-at places. Nozzle parts made of stainless steel. Write for Bulletin 76.

SPRAYING SYSTEMS
TRIGGER
TeeJet®



For effective coverage of smaller room areas. Choice of interchangeable tips and capacities for flat, solid and cone sprays. Write for Bulletin 68.

SPRAYING SYSTEMS CO.
3221 Randolph Street • Bellwood, Illinois

Bait Controls Medfly

A bait devised by Dr. L. F. Steiner of the U. S. Department of Agriculture, is reported to be effectively controlling the Mediterranean fruit fly that has plagued Florida, as well as the Oriental fruit fly and the melon fly, both serious pests in the Hawaiian Islands. The melon fly was recently reported in California.

The bait spray applied to thousands of acres in southern Florida combines malathion with a yeast extract, protein hydrolyzate. The protein is said to be a powerful attractant for the flies and the malathion kills them.

Burney Named Surgeon General

Dr. Leroy E. Burney, a career government health official, has been named Surgeon General of the U. S. Public Health Service. He succeeds Dr. Leonard A. Scheele who resigned as Surgeon General recently to assume the presidency of the Warner-Lambert Pharmaceutical Company's Warner - Chilcott Laboratories, Inc., Morris Plains, N. J.

Dr. Burney received an M.D. degree from Indiana University in 1930, and an M.S. degree in public health from Johns Hopkins University's school of hygiene and public health in 1932.

Before his appointment to Surgeon General, Dr. Burney was deputy chief of the Bureau of State Services. That post is now filled by Iowa-born, Dr. Theodore J. Bauer, another Public Health Service career officer.

Order 100,000 Velsicol Folders

Since Velsicol Chemical Corporation announced the availability of insect control folders and advertising mats in the July issue of **Pest Control**, the company has had requests from PCOs for over 100,000 of these mailing pieces.

These self-mailing folders, each carrying a specific message on insect control to the consumer, are still available to PCOs. Insects covered are termites, lawn insects and household insects.

Also available are a series of three small size newspaper advertising mats, a picture sheet featuring common household insects, and another illustrating lawn and garden insects. The insect illustrations can be used in the preparation of promotion pieces and special newspaper and telephone directory advertisements, Velsicol says.

Samples of these promotion pieces can be obtained from Velsicol Chemical Corporation, 330 E. Grand Ave., Chicago, Ill.

Suppliers' Staff Changes

Ray Harshman has been named to head the newly formed pest control department of the Chapman Chemical Co. A member of the Chapman sales force since 1950, he will be located at firm headquarters in Memphis, Tenn.

W. Coleman Edgar is new sales manager of the Naval Stores Department's Agricultural Chemicals Division, Hercules Powder Co. He succeeds **P. J. Reno** who has been upped to manager of the division. Both men will remain at company administrative offices in Wilmington, Del. In another company personnel shift, **S. E. Cook, Jr.**, goes to Los Angeles, Calif., as agricultural chemicals representative in the West Coast territory.

Dr. Sylvan I. Cohen has joined Olin Mathieson Chemical Corp. as an agricultural research specialist in the research and development department of the insecticides division at Port Jefferson N. Y.

TERMITE CONTROL

with

Cooper Dieldrin

Available in

Two Outstanding Formulations

COOPER DIELDRIN

1.5 lb. emulsion concentrate

- Economical
- Spontaneous emulsion
- Emulsion stability
- Controls most major household and industrial pests such as termites, roaches, silverfish, ants, spiders, carpet beetles, ticks, fleas, etc.
- Controls most major soil insects, grubs, wireworms, rootworms, etc.
- Non-phytotoxic when used as directed. Safe to use around the home.
- Long lasting residual control
- Formulated from experience gained from over 117 years of service in the insecticide industry.

COOPER DIELDRIN

1.5 lb. oil solution

Use Cooper's Oil Soluble Dieldrin when water emulsion is undesirable. Soluble in any commonly used solvent. You can rely on Cooper Dieldrin Insecticides for highly effective on-the-job-results.

Available in 50 gal., 30 gal., and 5 gal. drums

Order Today

WILLIAM COOPER & NEPHEWS, INC.

Established 1843

1909 NORTH CLIFTON • CHICAGO 14, ILLINOIS

Use these postage-paid cards to get

MORE PRODUCT INFORMATION

Straight from the advertisers

IF YOU WOULD LIKE FURTHER DATA ON ANY OF THE PEST CONTROL CHEMICALS, EQUIPMENT OR SERVICES ADVERTISED IN THIS ISSUE

Here's What To Do:

▼

Write the advertiser's name and the page number of the ad in the spaces provided on the card. Check the type of information you want — whether it has to do with price, where you can buy it, or more needed details — or all three, if you wish. After you have finished going through **Pest Control** and have jotted down all the ads on which you'd like more information, just tear off the card and drop it in the mail. No postage is required. We'll have our staff forward this information to the advertiser immediately, so that you will be relieved of the necessity of writing a number of letters. You will then hear directly from the advertiser, answering your request. Because we know that **Pest Control** gets around, and that more than one person sees your copy, we have made up three cards so that if you are one of the later readers you can still take advantage of this service.

Please send further information on the following advertisements in this issue:

PAGE NO.	NAME OF ADVERTISER	Send Technical Data	Send Price Information	Nearest Source of Supply
.....	.....	○	○	○
.....	.....	○	○	○
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.....	.....	○	○	○

Please Type or Print

YOUR NAME _____ TITLE _____

COMPANY _____

ADDRESS _____

CITY _____ STATE _____

10-56

First Class Permit No. 11141
(Sec. 34.9 P.L.&R.)
CLEVELAND, OHIO

BUSINESS REPLY CARD
No Postage Stamp Necessary if Mailed in the United States

3c POSTAGE WILL BE PAID BY —

PEST CONTROL
1900 Euclid Avenue
Cleveland 15, Ohio

Readers' Service Dept.

Please send further information on the following advertisements in this issue:

PAGE NO.	NAME OF ADVERTISER	Send Technical Data	Send Price Information	Nearest Source of Supply
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.....	.....	○	○	○

Please Type or Print

YOUR NAME _____ TITLE _____

COMPANY _____

ADDRESS _____

CITY _____ STATE _____

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Use these postage-paid cards to get

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YOUR NAME _____ TITLE _____

COMPANY _____

ADDRESS _____

CITY _____ STATE _____

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No Postage Stamp Necessary if Mailed in the United States

3c POSTAGE WILL BE PAID BY —

PEST CONTROL
1900 Euclid Avenue
Cleveland 15, Ohio

Readers' Service Dept.

A. F. C. QUALITY PRODUCTS FOR PEST CONTROL

Chlordane, oil concentrate, liquid emulsifiable concentrate, wettable powder concentrate, and ready-to-use liquids and powders.

Super Fluorex V, powerful insecticide powder
Sodium Fluoride
Poison Seeds
Pyrethrum and **DDT,** powders and liquids
Paradichlorobenzene

FOR EFFECTIVE RAT CONTROL

Phosphorous Paste
Rumetan (Zinc Phosphide)
Fortified Red Squill Extract and Powder
Antu and **Antu Tracking Powder**
Thallium Sulphate
Barium Carbonate
Arsenic White
Warfarin

FOR TERMITES

Orthodichlorobenzene, Creosote Oil, Sodium Arsenite Powder, Pentachlorophenol Concentrate

Write for particulars and prices

AMERICAN FLUORIDE CORPORATION
223 West 28th Street **New York, N. Y.**

Give Your Old Equipment A "Shot in the Arm" with PCE improved SHUT-OFF VALVES

They're standard on all **PCE** equipment, but you can be sure they'll make **any** equipment better.

Strong spring presses new corrosion-proof stainless steel plunger against Koroseal washer for positive, long-lasting shut-off.

Discharge end of valve is 1/8" I. P. S. female. Intake end of valve is 1/4" I. P. S. female.

$3.45 each

PEST CONTROL EQUIPMENT CO.
24 North Bond Street MO-8-1197 **Mount Vernon, N. Y.**
WEST COAST OFFICE
16054 Parthenia, Sepulvada, Calif.
TEL.: Empire 2-6000

"FOR 70 YEARS CHOICE FOR QUALITY THE WORLD OVER"

SMITH SPRAYERS

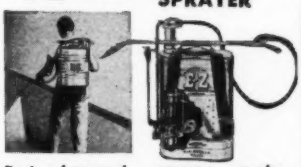
Complete line of hand, continuous, compressed air, knapsack, bucket, wheelbarrow and barrel sprayers and insecticide dusters. Many styles of spray nozzles. Quality design and performance.

Streamlined BLIZZARD Copper Continuous Sprayer

World's Finest
Two Sizes: Pint, Quart (39 ounces)

Solid copper tank. Seamless, highly polished brass pump barrel. Beautiful design. Sturdy construction. Lasts for years. Double nozzle sprays fine, powerful mist straight ahead or at any angle.

E-Z 5 GAL. KNAPSACK SPRAYER



Best knapsack sprayer made. Pump lever quickly develops high pressure. 5 gal. zinc grip steel or copper tank. Adjustable nozzle for 20-30 ft. or short, fine, powerful mist spray. Unexcelled for every spraying need.

RITE SIZE SPRAYER

2 Gal., compact compressed air sprayer. Dome top welded tank 5 ft. hose. 16" curved brass extension. Brass adjustable nozzle. Very popular. Light and easy to use.

SEND FOR CATALOG

D. B. SMITH & CO., 440 Main St., Utica 2, N. Y.

You Can MAKE MORE MONEY

by using and selling

FUMO-KILL

The New Effective Fumigant That Will Kill

Mosquitoes, Flying Moths, Spiders, Silverfish, Flies, Wasps, and Exposed Waterbugs, Roaches, Bedbugs, and Ants.

FUMO-KILL is truly the modern method of insect extermination. Light match to contents in can, will produce fumes — NO FLAME. Non-hazardous. This amazing FUMO-KILL insecticide has been tested, and found effective against most types of household pests.

FUMO-KILL has the following advantages:

EASY TO USE: Requires no Special Equipment.

ECONOMICAL TO USE: Two ounces fumigates up to 6,000 cubic feet.

EFFECTIVE TO USE — Follow instructions on can for best results. **This Amazing FUMO-KILL insecticide is by all qualifications, a leader in its field.**

FUMO-KILL can be obtained in 2 oz. (enough for up to 6,000 cubic feet)—4 oz. and 1-lb cans.
Cost of 12—2-oz. Cans . . . $7.50 per doz.
Cost of 12—4-oz. Cans . . . $13.50 per doz.
Bulk . . . . . $4.50 per lb.

Delivery Charges Prepaid
For complete information write or phone today.

MAR-MEL PRODUCTS, INC.

Phone: Van Buren 6-2060-61
753 South Kedzie Ave. **Chicago 12, Illinois**

Infestation Report

Contains pertinent portions of the Department of Agriculture's **Cooperative Economic Insect Report**, material from university entomology departments, and reports from readers. PCOs noticing infestations in their own areas are urged to communicate with **Pest Control** so their information may be added to this infestation report.

AN EARWIG
(Anisolabis maritima)

Virginia: Causing concern to a fisherman in Northumberland by killing soft crabs.

ANGOUMOIS GRAIN MOTH
(Sitotroga cerealella)

Texas: Medium local infestations in stored wheat in Van Zandt County.

BALD-FACED HORNET
(Vespula maculata)

Rhode Island: Unusually high number of complaints of annoyance in Providence and Cumberland areas.

BLACK FLIES

Minnesota: Large numbers reported from northeastern area.

BOXELDER BUG
(Leptocoris trivittatus)

Pennsylvania: Adults and nymphs migrating in Luzerne County.

CHIGGERS

Maryland: Annoying in suburban areas. **Wisconsin:** Infestations much heavier than in recent years and over large areas of state.

FIELD CRICKET
(Acheta assimilis)

California: Unusually common in some Sacramento Valley districts. Migrating from fields into houses.

FLEAS
(Ctenocephalides spp.)

Maryland: Common in homes. **Alabama:** Locally abundant in several parts of state.

GRANARY WEEVIL
(Sitophilus granarius)

Texas: Heavy local populations in stored wheat in Van Zandt County.

HOUSE FLIES

South Carolina: Heavy infestations in Chester and York Counties. **Maryland:** Increasing around dairy barns and hog pens in most sections.

KHAPRA BEETLE
(Trogoderma granarium)

Florida: A recent survey of feed and seed stores on the east coast failed to reveal an infestation.

LONE STAR TICK
(Amblyomma americanum)

Oklahoma: Nymphs present in Pushmataha, Latimer, McCurtain and LeFlore Counties.

MIDGES
(Chaoborus spp.)

Rhode Island: Swarming in great numbers in Cranston.

MILLIPEDES

Pennsylvania: Very numerous and annoying in several locations in Montour County.

MOSQUITOES

Utah: Serious problem at Springville. Troublesome in Wever County. **Rhode Island:** Abundant and annoying in Matunuck recently. Biting rate 12 per minute. Report of equine encephalomyelitis in work house in Kent County. Possibly borne by mosquitoes. **Minnesota:** Large populations reported from northeastern area. Very large populations entered Twin Cities recently. **Virginia:** Outbreak of encephalitis in horses reported from one area of Lee County. Possible encephalitis of horses reported from King George County recently. **North Carolina:** Biting fiercely on Cedar Island, Carteret County, recently. **Oregon:** Extensive mosquito abatement program being organized in Grant County to combat encephalitis. **Maryland:** Cases of equine encephalomyelitis reported on lower eastern shore. **Colorado:** Recent rains increased populations in northeastern part of Denver in stockyards.

OLD HOUSE BORER
(Hylotrupes bajulus)

Virginia: Damaging siding of house in Augusta County.

RODENTS

New Jersey: Two pest control firms hired by city of Hoboken to exterminate rodents in section of city's sewerage system.

SALT-MARSH MOSQUITO
(Aedes sollicitans)

Rhode Island: Large numbers causing considerable annoyance in Pt. Judith area recently.

STRAWBERRY ROOT WEEVILS

Oregon: Migrating and entering homes in many locations in Willamette Valley.

TABANIDS

Wisconsin: Populations much heavier than for years and over large areas of state. **Rhode Island:** Continue abundant over state.

TICKS

Louisiana: Very heavy populations in Livingston and West Feliciana Parishes. **Texas:** Heavy infestations on dogs in Bexar and Brazos Counties.

This is worth looking into

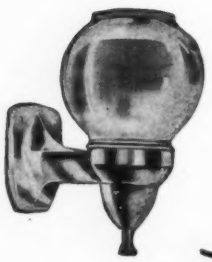
EXTRA PROFITS FOR YOU...

That's right: *Extra Profits!*

Many PCO's today handle the nationally known quality-proven line of Moore dispensers and soap dispensing equipment.

This enables them to give to their clients a more complete sanitary sales and service program. Why not look into this yourself!

Moore manufactures over 26 different models; a type for every installation. Write today for our catalog sheet and jobbers price list, with discounts.



ONE OF OUR BEST SELLERS
The ORIGINAL "PEER" #100

Good looking . . . sanitary
Non-Clogging

MOORE BROTHERS COMPANY

104 WARREN STREET NEW YORK 7, N. Y.

Quality proven soap dispensers and dispensing equipment

the SPRAYER that every P.C.O. MUST HAVE!

IDICO STAR pistol type SPRAYER

It is light . . . compact . . . with the easy hand grip and control—no dripping.

PISTOL HAND GRIP . Trigger Operates High Pressure Hydraulic Piston . . With Ease . . . No Heavy Pumping. Equipped with 1 quart brass bottom container. Large opening for easy and convenient filling.

• Can Be Used With All Type Liquids—Oils, Water, Emulsions, Deodorants, Moth Proofing Solutions, Etc.

INTERCHANGEABLE NOZZLES

1. Fine Fog.
2. Penetrating Pin Stream That Reaches 20 Feet or More.

AVAILABLE IN THE FOLLOWING MODELS

1. Straight Extension	B1	**$10.25**
2. Swivel Directional Extension	B3	**10.50**
3. Both Straight and Swivel Extensions	B4	**10.75**

On orders of 6 or more units—10% discount.

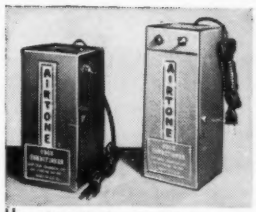
For all-copper containers for any model add $1 to each sprayer price.

WARRANTED TO GIVE LONG UNINTERRUPTED SERVICE AND USE

So Rush Your Order In TODAY!

Send for Catalog Sheet

IDICO PRODUCTS CO.
1 West 125th St., New York 27, N. Y.

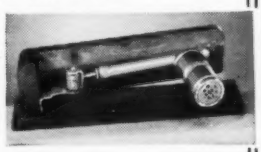


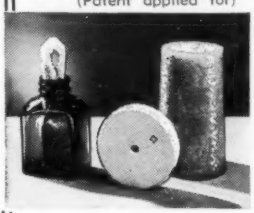
It's a pleasure to WORK if your truck smells from AIRTONE

AIRTONE Standard all electric odor conditioner. Heavy duty motor, lock and switch. Easy to maintain. $6.50 each.
AIRTONE DeLuxe all electric odor conditioner. Heavy duty motor, lock, pilot light and switch. Completely tamper proof. $7.00 each

Standard DeLuxe
AIRTONE Automatic Door Closer ODOR CONDITIONER

Adjustable to any door, in any position. Full instructions, spring wrench and screws included with every machine. $4.00 each.
(Patent applied for)





AIRTONE Highly Perfumed

100% Para Blocks. Ceramic Discs and Wick Deodorants. 37 very long lasting odors. 30c each. Write for samples.

AIRTONE Deodorant and Disinfectant Spray

100% active ingredients. (Spearmint and Floral) $4.50 per gallon. Contains no formaldehyde. Can be cut up to five times with water.

AIRTONE Ceramic Discs 30c each. Discount over 500. AIRTONE Wick Deodorants (Throw-away bottles) 30c each. Discount over 1000.
AIRTONE 100% Highly Perfumed Para Blocks for door machines 30c each. Discount over 500.

AIRTONE

CHEMICAL COMPANY
Manufacturers

322 S. Fremont Ave.
Baltimore 30, Md.

Stanzoil®

Impermeable Gloves Provide Positive Hand Protection

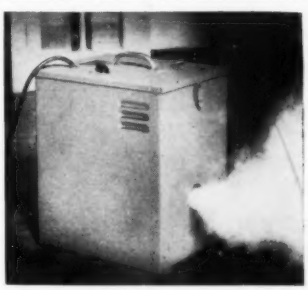
Stanzoil Impermeable Neoprene gloves, with special nylon barrier developed for handling tetraethyl lead, give you protection from agricultural sprays, insecticides, fumigants and other toxic chemicals when used as recommended by chemical manufacturers.

FREE catalog available on request. For help in selecting the proper glove, send a complete description of your hand protection problem to our "Hand Protection Clinic" on your letterhead.

Order No.	Weight	Length	Sizes
EW-32	Medium	11″	10, 11
EW-41	Heavy	12″	9, 10, 11
EW-51	Heavy	14″	9, 10, 11

the **PIONEER** Rubber Company | 247 Tiffin Road Willard, Ohio

Pioneers in Hand Protection for over 35 Years



Hundreds of P.C.O.'s Have Purchased

PESTRON UNITS

One of the MOST POWERFUL Weapons Ever Devised Against
ANTS • BEDBUGS • CARPET BEETLES • FLEAS SILVERFISH • COCKROACHES • CLOVER MITES TICKS • and other Insect Pests!

A Few of Hundreds of Satisfied Users:

Ace Sanitary System
Able Pest Control Co.
Chemtox Company
Hill & Hill
W. P. Hammond & Sons
Inter-State
Illini Pest Control
Nolen Economy Exterminating
Orkin Exterminating Co., Inc.
Pest Control Services, Inc.
Rose Exterminating Co.
Smithereen Company
Terminex Company
Wil-Kil Pest Control
Vogel Ritt, Inc.

- No fire hazard
- No oily film on furnishings
- No mixing of chemicals
- Only one filling necessary per day
- Uses pure, dry Lindane, effective against all household insects.
- No lingering odor
- Portable

Write for names of other users in your locality

ORDER TODAY!

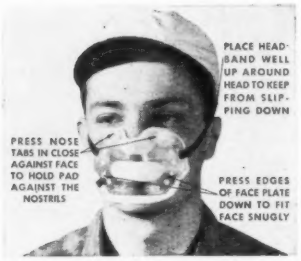
Prove to yourself that PESTRON will do the job better! $198.50, F.O.B. Los Angeles, new stainless steel model. Guaranteed against defects for 1 year after purchase.

PESTRON

Pest Control Prod. Co.
6201 Santa Monica Blvd.
Los Angeles 38, Calif.

MARTINDALE

PROTECTIVE MASKS


PLACE HEAD-BAND WELL UP AROUND HEAD TO KEEP FROM SLIPPING DOWN
PRESS NOSE TABS IN CLOSE AGAINST FACE TO HOLD PAD AGAINST THE NOSTRILS
PRESS EDGES OF FACE PLATE DOWN TO FIT FACE SNUGLY

Clean, cool, comfortable, excellent protection against non-toxic dusts except free silica. Replaceable cotton pads are inexpensive and sanitary.

Protective Masks ..... $.30 ea.
No. 1 Refills (standard wt.) .02 ea.
No. 2 Refills (heavy wt.) .02½ ea.
Masks packed in individual envelopes.
Refills packed 25 to a box.
No. 2 Refills (heavy wt.) contain twice as much filtering cotton as No. 1

DISCOUNTS

Less than $10.00 list	Net
$10.00 to $24.99 list	10%
$25.00 to $99.00 list	15%
$100.00 and over	20%

Minimum charge or C.O.D. $2.00
Minimum, cash with order ... $1.00

If payment accompanies order we will pay parcel post or express charges.

MARTINDALE ELECTRIC CO.
1367 Hird Ave. Cleveland 7, O.

MR. PCO . . . THIS IS IT

- Everyone is Moth and Carpet Beetle Conscious;
- Valuable Rugs and Carpets are being protected from Moth and Carpet Beetle damage;
- Large Profits are being made by aggressive **PCOs** who are mothproofing and giving **PER-MO's 5-YEAR** Written Guarantee.

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WRITE Today for Full Details On any or all products!

OUR 21st YEAR

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Kansas City 1, Mo.

Recent USDA Releases

The following publications are available free from the Office of Information, U S. Department of Agriculture, Washington 25, D. C. When ordering make sure to include titles and index numbers of publications you want.

Screening Tests of Esters of Chrysanthemumic Acid As Synergists and Insecticides. 1956. 10 p. ARS-33-23.

Storage of Pea Beans in Michigan and Indiana. 1956. 78 p. AMS No. 123.

Insecticide Residues in Meat and Milk. 1956. 30 p. ARS-33-25.

Use of Insect Repellents. 1956. 5 p. ARS-33-26.

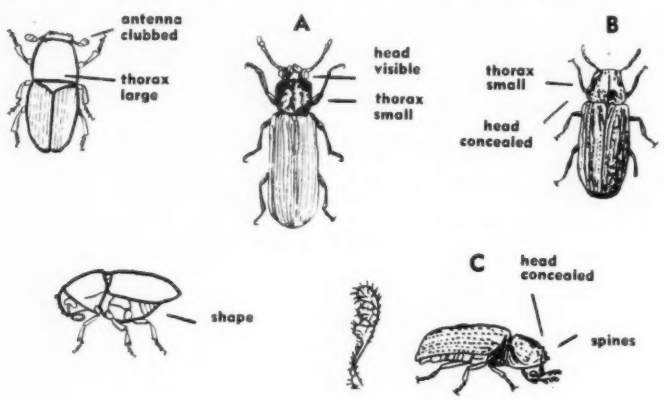
Primer

LOOK ALIKES: 22

Prepared by DR. MARION E. SMITH and HSIU-FU CHAO
Entomology Department, University of Massachusetts, Amherst

Small Wood Borers

Many insects so closely resemble some other species that they are often mistakenly identified. In these columns distinguishing features of insects that look alike are pointed out so operators can quickly and accurately put the proper tag on pests they come in contact with. Last month the authors took up the spotted Mediterranean roach and wood roaches. In this issue physical differences between small wood borers are covered. Keep these columns and add them to your entomological library.



BARK or AMBROSIA BEETLES

Family Scolytidae—many species

POWDER-POST BEETLES

Lyctidae — A
Anobiidae — B
Bostrichidae — C

Look For

Small beetles under bark of firewood.
Fine tunnels or engravings under bark of firewood.
Short stubby beetles, usually dark or dull, with posterior end often blunt or oblique or with spines, antenna clubbed.
Fine sawdust or emergence holes in dry seasoned timber or in furniture or house timbers.
Small elongate beetle (A) with head visible, or short stubby dark ones with head bent underneath and end of body rounded (B and C).

Habits

Breed only in living or recently-killed trees, making fine engravings under the bark.
Occasionally brought into houses in firewood. Cannot cause any damage to buildings, furniture, or any dry wood.
Continue to breed in dry wood of buildings, often causing serious damage.

SENCO 2% THALLIUM CORN MIX KILLS PESKY, NIBBLING MICE

2% Thallium Corn Mix consists of cracked corn and whole oat kernels, impregnated with 2% Thallium Sulfate.

2% Thallium Corn Mix has a malted, corny, breakfast food odor and taste, which is very attractive to mice.

2% Thallium Corn Mix never becomes moldy, or infested with weevils. It stays on the job a long time, and takes care of future infestations.

2% Thallium Corn Mix is simple, clean, and economical to use. One pound makes about 100 teaspoonful baits. One teaspoonful of Corn Mix will kill a lot of pesky, nibbling mice.

If you want to kill a lot of mice — overnight — just use the most attractive and toxic, ready-to-serve bait that you can buy—Senco 2% Thallium Corn Mix.

PRICES

10 pounds	$ 8.75	50 pounds	$29.00
25 pounds	16.75	100 pounds	56.00

Freight Prepaid

2% Discount IF Check Is Sent With Order

Write For Complete Price List And Senco News

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2721 Chouteau Ave., St. Louis, Mo.

ENTOMOLOGISTS WANTED

Structural Pest Control Experience

We have immediate openings for aggressive young men, with sales ability and minimum of 2 to 3 years of structural pest control experience, to manage offices. Liberal salary, commissions and over-rides enabling hard workers to earn $8,000-$10,000 annually. Many other company benefits. Must be available immediately. Write giving experience and small non-returnable photo. Interviews in Pittsburgh, at our expense.

Write L. L. Crosby, President
Commonwealth Sanitation Company
3567 Bigelow Boulevard
Pittsburgh 13, Pennsylvania

ONE GALLON STAINLESS STEEL SPRAYER

Unnecessary to remove pump for large top opening. Easier to fill . . . easier to clean out. All screw-type or internal pressure seals at top inlets. 5 ft. PCE ¼ i. d. chemical and oil resistant hose. Special Schrader shut-off valve, 9" curved aluminum extension with easy nozzle change end. Spraying Systems Co. teejet (fan pattern) nozzle.

Another Fine Professional Tool - Exclusive With PCE

AS ILLUSTRATED **$26.50**

WITHOUT GAUGE **$24.50**

as shown plus coupler at valve end of hose **$30.00**

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may we suggest. . .

the Motor Bar

distinguished dining
moderate food prices
distinctive drinks

music by the
Leonard Stanley Quartet
5 pm to 1am
dancing: 10 pm to 1 am

open: 4 pm street level
closed: Sundays, holidays

SHERATON-CADILLAC HOTEL

Mark Schmidt, general mgr.

Classifieds

When answering ads where box number only is given, please address as follows: Box number, c/o Pest Control, 1900 Euclid Avenue, Cleveland 15, Ohio.

Rates: "Position Wanted" 5c per word, minimum, $1.00. All other classifications, 10c per word, minimum $2.00. All classified ads must be received by Publisher at least three weeks preceding publication date and be accompanied by cash or money order covering full payment.

HELP WANTED

ONE of the oldest and largest pest control firms in the East, operating over a large area, has career opportunities for several high caliber men with ambition and management ability. Practical experience in pest control or related professions helpful though not essential. Liberal salary and incentive plan offer the opportunity for an excellent financial future in a growing and progressive organization. All replies will be held strictly confidential. Write in full detail to President, Bliss Exterminator Co., Inc., 151 Lexington Ave., New York 16, N. Y.

ENTOMOLOGISTS with structural pest control experience. We have immediate openings for aggresive young men with sales ability and minimum of 2 to 3 years of structural pest control experience to manage offices. Liberal salary, commissions and over-rides enabling hard workers to earn $8-$10,000 annually. Many other company benefits. Must be available immediately. Write giving experience and small non-returnable photograph. Interviews in Pittsburgh at our expense. Write L. L. Crosby, President, Commonwealth Sanitation Company, 3567 Bigelow Blvd., Pittsburgh 13, Pa.

GENERAL pest control manager for Honolulu, Hawaii. Must be able to sell, train operators and service "the tough ones" personally when necessary. Expert wanted on roaches, rats, ants and other household and commercial pests. (No termites) Only a person with an excellent record on sales and production desired. Person with degree in entomology or similar preferred. Good salary, commission and over-ride on department. Fully paid insurance program. Mainland interview in October. All replies confidential. Write full details to Box 417 Pest Control magazine.

WORLD'S LARGEST pest control firm, operating in 28 states from coast to coast, needs several high-caliber men for responsible positions. Must have initiative, good judgment, the ability to work and deal with people, and should be personally ambitious. Experience in professions related to pest control helpful. Liberal salary and incentive arrangements provide excellent opportunities with progressive and well established firm. Employee benefits include paid vacations, sick leave, life insurance, hospitalization and pension plan. Training programs for our future managers and other supervisory positions also open to college graduates. All replies confidential. Contact Technical Department, Orkin Exterminating Company, Inc., 713 W. Peachtree Street, N.E., Atlanta, Georgia.

Feeds BOTH dry and liquid bait, at the same time!

Constructed of durable *galvanized steel.* Rust and weather proof. Proved effective, the choice of PCO's. Two sizes available for immediate delivery.

No. 1
26 guage, single compartment, 9" x 9" x 5½" high.

No. 2
24 guage, double compartment, (illustrated) 17" x 10" x 8" high.

Write for NEW LOW PRICES

Universal ELECTRIC PRODUCTS CORP
P.O. Box 3216 4200 So Mendota St.
Madison 4, Wisconsin

WANT TO BUY

INDIVIDUAL will buy pest control business in New York City vicinity. Box 420 Pest Control magazine.

FOR SALE

INSECT MODEL manufacturer, west central Alabama. Manufactures models for schools, museums, exterminators, etc. Unlimited potential. F.P.: $5,000. Dept. No. 7862, Charles Ford & Associates, Inc., 6425 Hollywood Blvd., Los Angeles 28, Cal.

Ohio Rodent Control Course

A two-day rodent control short course will be held in the auditorium of the City Board of Health, Columbus, Ohio, on November 15 and 16. William D. Fitzwater and Galen Oderkirk, Fish and Wildlife Service district agents from Purdue University, Lafayette, Ind., will instruct.

Tentative plans call for a general rodent control session the first day of the short course and field trips with city rodent inspectors the second day.

No charge will be made for the course, but PCOs wishing to attend should contact Dr. Joseph Drayer, Deputy Health Commissioner, Columbus Department of Health, 181 Washington Blvd., Columbus, Ohio.

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Leading P.C.O.'s find that they reduce costly **CALL BACKS** to a minimum with **Hopkins Warfarin Products.** They're time-tested, and have proven tops for effective rodent control.

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60¢ EACH

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For further information write:
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713 West Peachtree St., N.E.
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WORLD'S LARGEST PEST CONTROL COMPANY

KEEP WATER - RUST - LINT - DUST OUT OF YOUR FORMULATIONS

with the NEW BOWEN **Chemical Strainer Funnel**

for Insecticides, Acids, Alkalis and Solvents

When you mix your own active ingredients with solvents and carriers you can be sure to eliminate equipment clogging foreign matter, contaminating moisture by utilizing the industry-accepted Bowen Polyethylene Funnel with stainless steel filter cloth.

Order Yours Today!

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5 YEAR GUARANTEED

MOTHPROOFER

Many Pest Control operators are realizing extra profits with the new 5 Year Guaranteed MOTH CHEK Mothproofer, due to the vast increase of new homeowners who are anxious to protect their new carpets and upholstery from the ravages of moths and carpet beetles. Chek Chemical Products Co., issues a 5 Year written guarantee and assumes 100% liability in the event of a claim. Tested and proved by the laboratories of the U. S. Testing Co., and the National Institute of Drycleaners.

Results of tests available on request.

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Also available, the new liquid FLAME CHEK which offers a tremendous profit potential in the application of Flameproofing in hotels, motels and other institutions.

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Now available, Chlordane, DDT, Dieldrin and many other concentrates for P. C. O's.

Write for complete information and prices.

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Dept. PC 10, 89 Madison St., Newark 5, N.J.

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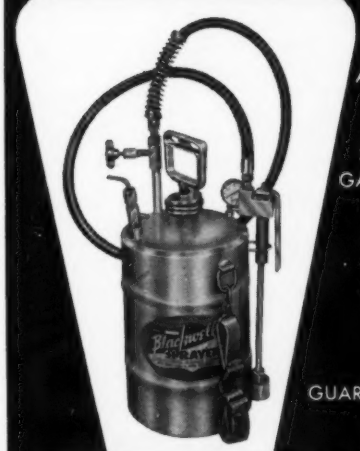

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Why allow bad equipment to waste your profits? Find out what Blackwell Sprayers offer you at no extra cost . . . write now for Folder No. 561.

Blackwell BURNER CO.

CApitol 6-8551
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5033 W. Commerce St.
San Antonio 7, Texas

Pestales

Miscellaneous Mouse: *Red face file room employees in one of our Eastern State Capitol Buildings will turn a vivid shade of scarlet if the word mouse is mentioned in front of them again. Recently, a little furry rascal invaded the building's stenographer's room. Twelve women typists quickly took refuge atop chairs and desks. Frightened by the commotion, the mouse scampered down a corridor and into a file room where more women were working. The hysterical ladies quickly abandoned the room and went for help. When some male employees arrived to deal with this menace, there was no sign of the little invader. It wasn't until several days later the mystery was unraveled. A clerk searching for a letter the boss wanted, opened one of the drawers and there was the mouse—filed under miscellaneous!*

* * *

Roach Jelly? A southern PCO friend of ours is too suspicious. He recently visited a strange town and went into a nice clean restaurant to order the popular ham, eggs and hominy grits for breakfast. When these delectible morsels arrived, an open dish of jelly accompanied them, so our friend lavishly coated a slice of toast and raised the delicacy to his mouth. There it stopped. He had nauseously detected the unmistakable odor of the American roach. The waitress apologized and removed the jelly. The same day, this "alert" PCO contacted a local PCO friend so the local man could get a new contract. "But, Sam," he said, "That restaurant is already my customer. Just the same, thanks. I'll check on it." He never did find evidence of roaches and was too polite to set our helpful friend straight.

Some weeks later, and after many repetitions of his original "disgusting" find, the visiting operator's wits started to function. It finally dawned on him to ask the waitress just what kind of jelly was being served. Her face lit up with pleasure. "Why this jelly is as famous in the South as hominy grits. It's Guava jelly." And that was it. Guava jelly has a beautiful aroma exactly like the musty smell of the American roach. Now Guava jelly is this PCO's favorite and he's a bit more careful with his suspicions.

* * *

Cowboy Clobbers Chewer: *An Idaho cowboy believes in controlling rats the hard way. Puncher Ernst Olsen didn't like the way a pack rat kept chewing up a new saddle that was his pride and joy. First time he spotted the culprit perched on a platform in the ranch barn he fired at it with his .410 gauge shotgun. Only one thing wrong—our hero didn't notice a box of dynamite was stored on the same platform. The explosion blew the roof and sides from the barn and hurled the "marksman" Olsen unconscious outside. That's one sure way of getting rid of a rat if you don't mind a few weeks in the hospital.*

* * *

Wedding Bells. James R. Carncross, son of NPCA prexy I. B. Carncross, was married to the former Miss Susan Chase Higgins at the Dewitt Community Church, Dewitt, N. Y., on August 18. He plans to become a PCO and to join Dad in operating their Syracuse Chemical Co. just as soon as he completes studies at Syracuse University.

* * *

Railroading Rodents: *The thrifty Swiss have come up with a way to utilize mice in their railway maintenance crews. Mice save the government railroads much trouble and money by keeping tunnels spotlessly clean. Officials say that as soon as a train has passed, the mice dash into action and eat everything edible thrown from windows by passengers.*

* * *

Famous Family. Sam Reid, new executive secretary of the Pest Control Operators of California, reports there is a U. S. Navy destroyer with the same name as his. The ship was actually named after Sam's great-grandfather, who was a Commodore in the U. S. Navy during the War of 1812. Sam himself is an old destroyer man, having put in four years as a navigation officer on one of Uncle Sam's tincans during World War II.

* * *

Alex or Jerry? Either is correct for Alexander Williams, Shell Chemical's special representative for the pest control industry. African-born Alex was nicknamed "Jerry" by fellow swabbies when he was in the U. S. Navy during the war.

Get rid of bad

ODORS

and get more business

Two good ways to increase your business are (1) deodorize the premises with Aireactor when you finish an insect control job; (2) sell Aireactor to the people you call on — a proven way to create extra income.

Aireactor is the most profitable space deodorizer to use or sell. It is a clear, non-flammable solution formulated from non-toxic elements of plant life which, as in nature, do deodorize. It dissipates bad odors completely — yet never makes the place "perfumy." It leaves the premises smelling fresh, pure and clean.

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Aireactor can be used indoors as a spray, or in air conditioners, or ventilating systems; can be evaporated from Aireactor equipment or fogged for air pollution problems etc.

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controls bad odors after pest control

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To Combat Super Strains of Resistant Insects Revitalize "Tired" Formulations With Pyrenone*

AT transportation centers in many parts of the country, there is increasing evidence of the appearance of super strains of *resistant* flies and roaches.

Often the addition of Pyrenone concentrates to standard sprays and powders will heighten their "flushing" effect . . . give them greater killing power. Or by using larger dosages of Pyrenone, where conditions indicate, professional sanitarians and PCO's may regain control of super strains — including both flying and crawling varieties.

Active ingredients of the versatile Pyrenones are technical *piperonyl butoxide* and *pyrethrins* — both of which are virtually non-toxic to human beings or warm-blood animals. In *sensitive* food areas, where safety to consumers is all-important, sprays and powders based on Pyrenone present relatively little, if any, toxicity hazards.

Our trained technicians and modern laboratories in Baltimore are always available to help you. Write the nearest office of Fairfield Chemical Division, Food Machinery and Chemical Corporation. Branches in Principal Cities. In Canada: Natural Products Corporation, Toronto and Montreal.

*REG. U.S. PAT. OFF., F.M.C.

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PIVAL— An anti-coagulant for Rat & Mouse Control.
The new insect and mold-resistant rodenticide for use in dry baits. 1 lb. plus 19 lbs. of suitable cereal will make 20 lbs. of a ready to use bait.

PIVALYN— A Water-soluble anti-coagulant rodenticide.
One packet to one quart of water. Mold-resistant action provides excellent keeping qualities, even with sugar added. Holds up in field usage for 3 to 4 weeks.

FUMARIN—22 A new anti-coagulant for rats and mice.
1 lb. plus 19 lbs. of suitable cereal will make 20 lbs. of a ready-to-use bait. Closely related to warfarin.

CYANOGAS "A" DUST —For spot fumigations

MICRONIZED 50% DDT
—As a tracking dust against mice

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SPECIALIZED CONCENTRATES
and
SOIL TREATING CHEMICALS
for the pest control industry

We also offer

For resistant

DIAZINON 25E —ROACHES & FLIES
2½ ozs. makes one gallon of spray
With long-lasting residual action
5 Gallon Drum — $14.15 per gal.
F.O.B. Geigy Agricultural Chemical Company's nearest warehouse

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Water soluble powder in packets.
Each packet makes one gallon of spray.
SINGLE BOX (enough for 10 gals.) $8.50
Case of 10 boxes $60.00

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Both of above products are approved for use only by P. C. O.'s on a "spot" application basis.

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LUCIDE FORMULATIONS of LINDANE
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